RA GR SERIES

TECHNICAL MANUAL

VERSION 2.0
FEBRUARY, 1995

Copyright : 1995 Riso Kagaku Corporation
All Rights Reserved. This Technical Manual was prepared and written for the exclusive use of RISO International Group Certified Dealers. Reproduction and/or transmittal of this material in any form or by any means, including photo-copying or recording of the information is strictly prohibited without the consent of a member of RISO International Group.

RISO INTERNATIONAL GROUP

RISO KAGAKU CORPORATION (JAPAN)
RISO, INC. (U.S.A.)
RISO EUROPE LIMITED (U.K.)
RISO HONG KONG (HONG KONG)
RISO UK (U. K.)
RISO THAILAND LIMITED (THAILAND)
RISO DEUTCHLAND GMBH (GERMANY)
RISO FRANCE (FRANCE)
RISO IBERICA (SPAIN)
RISO CANADA (CANADA)
RISO CHINA (HONG KONG)

PREFACE

This manual provides Technical Service Information for the RISOGRAPH **GR Series** duplicators. You are advised to use this together with "RA Series" Techncial Manual as this "GR Series" Technical Manual includes only the items different from the RA Series machines. We recommend that "GR Series" and "RA Series" Technical Manuals are bound in a same binder for quick reference.

This manual is published as a reference guide for use by RISO Group (RISO Kagaku Corp./RISO,INC./RISO EUROPE Ltd.) Certified Technical Representatives experienced in duplicator repair and service.

This manual also provides procedures for removing and installing major components. Following these procedures will minimize machine malfunctions. This information and format will also increase technical representatives' awareness and experience regarding repairs necessary to insure end-user satisfaction.

If assistance is required, please contact one of the following:

[RISO Kagaku Corp.]

Overseas Technical Section, Technical Support Department
2-5-1, Akanehama, Narashino-shi, Chiba 275, JAPAN
TEL: (0474)52-4111 FAX: (0474)52-3106 TELEX: 252-2298RISO J

[RISO EUROPE LTD.]

1230 High Road,Whetstone,London N20 0LH,United Kingdom
TEL: (81)446-1188 FAX: (81)446-9547

[RISO, INC.]

NOTE : Before attempting to correct machine malfunctions, study the Technical Manual and make sure all questions and/or concerns have been satisfied. If necessary, please use the Technical Hotline:

TECHNICAL HOTLINE

800-578-7476
(Emergency Technical Assistance Only!!!)

REFERENCE	ADDRESSES	FOR
A	RISO, INC. Tech. Support Center 310 Andover Street Danvers, MA 01923	Technical Support Operations Correspondence and Technical Training
B	RISO,INC. REPAIR DEPT. 310 Andover Street Danvers, MA 01923	Repairs and Warranty Claims

CAUTION

[Handling of Lithium Battery]

- **Never fail to follow the following instructions when you discard the used lithium battery.**

1. Never let the battery short-circuited.
If the (+) and (-) terminals contact each other or metal materials, the battery will be short-circuited. If the batteries are collected and stored inorderly or one upon another, the above-mentioned case will occur.

- DANGER -
If the battery is short-circuited, it will heat up and may in some cases explode into fire.

2. Never heat up the battery.

- DANGER -
If you heat the battery up to more than 100°C or put it into the fire, it may burn dangerously or explode.

3. Never disassemble the battery or press it into deformation.

- DANGER -
If you disassemble the battery, the gas pouring out of the inside may hurt your throat or the negative lithium may heat up into fire.
If the battery is pressed into deformation, the liquid inside may leak out of the sealed part or the battery may be short-circuited inside an explode.

4. Never fail to keep the battery out of reach of children.
If you put the battery within reach of children, they may swallow it down.
Should they swallow the battery, immediately consult the doctor.

[Replacement of the Lithium Battery]

1. **The lithium battery must be replaced by a trained and authorized service technician.**
2. **The battery must be replaced only with the same or equivalent type recommended by the manufacturer.**
3. **Discard used batteries according to the manufacturer's instructions.**

!! WARNING !!

Important Safety Precautions

1. Always disconnect electrical supply before placing hands in the machine.

I. To avoid injuries:
Be sure to disconnect the electrical power before disassembling, assembling, or when making adjustments on the machine.

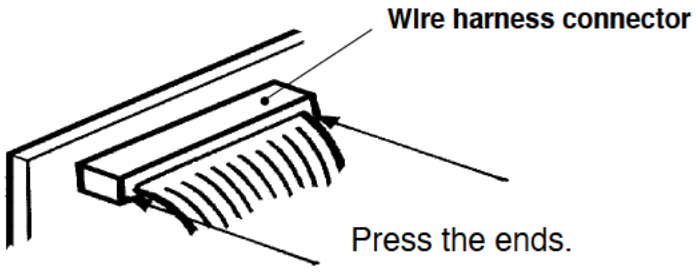
II. Protection of the machine:
Make sure to turn OFF the power to the machine before plugging or unplugging the electrical connectors, or when connecting a Meter.

2. Always connect electrical connectors firmly.

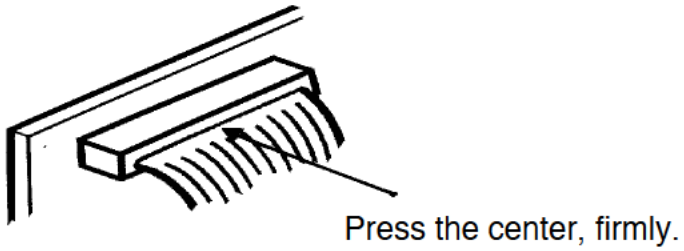
I. To avoid electrical failure:
The connectors must be connected firmly together and onto the PCBs.
Press on the ends of the connectors and then on the middle to ensure a firm fit.

II. Protection of the electrical components:
The electrical components may be damaged due to short circuits caused by a loose connector.

FIRST



THEN



CONTENTS

SPECIFICATIONS

1. **RA4200 .....SPC-1**
2. **RA4900 .....SPC-2**
3. **RA5900 .....SPC-3**
4. **GR3750 ..... SPC(GR)-1**
5. **GR2750 ..... SPC(GR)-3**
6. **GR2710 ..... SPC(GR)-5**
7. **GR1750 ..... SPC(GR)-7**
8. **GR1700 ..... SPC(GR)-8**

MECHANICAL OVERVIEW

1. **Cross Sectional View**
    1. Sheet Type Machine VIEW-1
    2. Flat Bed Type Machine VIEW-2
2. **Paper Feed and Receiving VIEW-3**
3. **Master Removal and Feed VIEW-4**

SECTIONIZED DESCRIPTIONS

1. **Paper Feed Section**

[Theory of Operation]

1. Paper Feed Tray Mechanism I-1
2. Paper Feed Tray Elevation System..... I-2
3. Paper Feed Tray Safety System I-4
4. Paper Width Detection System I-5
5. First Paper Feed Rollers Rotarty System..... I-6
6. Paper Feed Pressure Select System I-8
7. Paper Pickup System I-9
8. Second Paper Feed System I-10
9. Vertical Position Control System I-11
10. Paper Pickup System <GR> I-13-GR1

[Removal & Assembly]

1. Paper Feed Tray Unit I-15
2. Paper Detection Sensor I-16
3. Paper Feed Tray Safety Sw (Bottom) - Not for RA4200 ..... I-16
4. Paper Size Potentiometer I-17
5. Paper Size Sensor I-18
6. Elevator Motor Unit..... I-19
7. Stripper Unit I-20
8. Scraper Unit I-21
9. Scraper and Pickup Rollers..... I-22
10. Guide Roller Unit I-23
11. One-way Spring..... I-24
12. Load Spring I-24
13. Paper Guide Plate I-25
14. Paper Sensor PCBs (Paper Sensor and Paper Feed Det. Sensor) I-26
15. Stripper Unit <GR>..... I-26-GR2
16. Stripper Sheet <GR>..... I-26-GR3
17. Paper Feed Clutch Ass'y <GR> I-26-GR4

[Adjustment]

1. Position of Elevator Upper Limit Sensor..... I-27
2. Stripper Plate Pressure I-28
3. Position of Stack Paper Feed Switch I-29

4. Position of P Disc (Start-time of First Paper Feed) I-30
5. Position of Timing Adjust Plate..... I-31
6. Position of Timing Lever..... I-32
7. Parallelism of Timing Roller..... I-33
8. Vertical Print Position I-34
9. Position of P Disc (Start-time of First Paper Feed) <GR>..... I-37-GR5

2. Press/Rotation Section

[Theory of Operation]

1. Drum Rotation Control System..... II-1
2. Press System II-2
3. Pressure Regulation System..... II-4
4. Pressure Regulation System <GR> II-5-GR6

[Removal & Assembly]

1. Main Shaft Face Plate II-7
2. Pressure Link Ass'y..... II-8
3. Pressure Lever II-9
4. Pressure Shaft..... II-9
5. Main Belt II-10
6. Main Shaft Ass'y..... II-12
7. Main Motor Unit II-13
8. Main Motor Unit <GR> II-13-GR8

[Adjustment]

1. Standard Pressure Position..... II-15
2. Installation Postion of Pressure Lever..... II-16
3. Resting Position of Pressure Lever (Pressure Roller)..... II-18
4. Position of Pressure Solenoid II-19
5. Resting Position of Hook Lever II-20
6. Position of Pressure Sensor Disc..... II-21
7. Standard Pressure Position <GR> II-23-GR9

3. Paper Ejection Section

[Theory of Operation]

1. Paper Ejection System III-1
2. Separator Positioning System III-2
3. Paper Ejection Guides Auto-setting System III-3
4. Paper Separation System <GR>..... III-6-GR10
5. Paper Ejection System <GR> III-6-GR11
6. Paper Receiving System <GR> III-6-GR12

[Removal & Assembly]

1. Separator..... III-7
2. Suction Unit III-8
3. Transfer Belt (4200) III-9
4. Transfer Belt (4900/5900) III-10
5. Wing Cam Shaft III-11
6. Jump Wing Sw III-11
7. Wing Motor III-12
8. Paper Receiving Sensors (Send) III-13
9. Paper Receiving Sensors (Receive) III-14
10. Separation Fan..... III-15
11. Separator <GR> III-16-GR13
12. Separation Air Pump <GR>..... III-16-GR14
13. Suction Clutch <GR>..... III-16-GR15
14. Separation Fan <GR-A3/Ledger> III-16-GR16
15. Separation Fan <GR-B4/A4/Letter> III-16-GR17

[Adjustment]
1. Position of Separator..... III-17
2. Position of Separator <GR> III-18-GR18
3. Air Power Adjustment of Separator Fan <GR> III-18-GR19

4. Drum Section

[Theory of Operation]
1. Drum Rotation Rear Check System IV-1
2. Drum Rotation Front Check system IV-2
3. Drum Locking System IV-4
4. Ink Supply System.....IV-6

[Removal & Assembly]
1. Drum Cover IV-9
2. Squeegee Unit.....IV-10
3. Squeegee Belt.....IV-11
4. Squeegee Roller..... IV-12
5. Ink Pump Unit.....IV-14
6. Ink Bottle Sw IV-15
7. Inking Motor.....IV-16
8. Drum PCB IV-16
9. Screens IV-17
10. Drum Body IV-18
11. Clamp Plate Ass'y IV-19
12. Lock Solenoid.....IV-20
13. Ink Bottle Sw Ass'y <GR> IV-20-GR20
14. Screens <GR-A3/Ledger>.....IV-20-GR21
15. Screens <GR-B4/A4/Legal>.....IV-20-GR22

[Adjustment]
1. Squeegee Gap IV-21
2. Squeegee Pressure Balance.....IV-22
3. Position of Ink Blocking Plates IV-23
4. Drum Position A (Drum Home Position).....IV-24
5. Squeegee Gap <GR>..... IV-25-GR23

5. ADF Image Scanning Section

[Theory of Operation]
1. ADF Setting System V-1
2. Original Loading System V-2
3. Image Scanning System V-5

[Removal & Assembly]
1. Image Scanner V-9
2. ADF Unit.....V-10
3. Original IN Sensor (Receive).....V-11
4. ADF Switch.....V-11
5. Original Feed Solenoid.....V-11
6. Read Pulse Motor.....V-12
7. Original Feed Motor.....V-13
8. ADF Stripper Roller V-13
9. ADF Transfer Roller V-14
10. Original Detection Sensor V-15
11. Original Registration Sensor V-15
12. Original IN Sensor (Send) V-15
13. ADF Pickup Roller V-16
14. White Roller (Read Roller) V-16
15. ADF Exit Roller.....V-16

16. Shading Sheet.....V-17
17. Shading Solenoid V-17
18. Shading Sheet <GR1750/1700> V-18-GR24

[Adjustment]

1. Gap between Image Scanner and White Roller V-19
2. Sensitivity of Original IN Sensor.....V-20
3. Scanning Start Position V-21
4. Image Elongation/Shrinkage Correction.....V-22
5. Horizontal Scanning Position V-23

6. Flat Bed Image Scanning Section

[Theory of Operation]

1. Scanner Table Setting System.....VI-1
2. Flat Bed Original Detection System VI-2
3. Image Scanner Initial Movement System.....VI-4
4. Image Scanning System - Without Book Processing Feature & ADF VI-6
5. Pre-Scanning System - With Book Processing Feature & Without ADF VI-8
6. Image Scanning System - With Book Processing Feature & Without ADF .. VI-10
7. ADF Original Loading system.....VI-12
8. ADF Image Scanning System VI-14
9. Image Scanning System - in Auto Scanning Contrast Adjustment Mode <GR>..... VI-16-GR25
10. ADF Image Scanning System - in Auto Scanning Contrast Adjustment Mode <GR> . VI-16-GR26

[Removal & Assembly]

1. Stage Glass.....VI-17
2. Image Scanner VI-18
3. Image Scanner Carriage VI-19
4. FB-Scanner Belts VI-20
5. Image Flexible Wire.....VI-21
6. Flat Bed Original Detection Sensor VI-21
7. Flat Bed Read Pulse Motor VI-22

8.FB-ADF Unit VI-23

9. ADF Glass VI-24
10. FB-ADF Original IN Sensor (Receive).....VI-24
11. ADF Switch.....VI-24
12. Original IN Sensor (send).....VI-25
13. FB-ADF Transfer Roller.....VI-26
14. FB-ADF Original Detection Sensor VI-27
15. Original Registration Sensor VI-27
16. FB-ADF Pickup Roller (Upper) VI-28
17. ADF Stripper Roller VI-28
18. White Roller (Read Roller) VI-28
19. FB-ADF Read Pulse Motor.....VI-29
20. FB-ADF Motor VI-30
21. Original OUT Sensor VI-30

[Adjustment]

1. Sensitibity of Original IN Sensor.....VI-31
2. Scanning Start Position VI-32
3. Image Elongation/Shrinkage Correction.....VI-34
4. Horizontal Scanning Position VI-36
5. Image Scanner ADF Home Position VI-37

7. Master Making Section

[Theory of Operation]

1. Heating Data Transmission System VII-1
2. Thermal Print Head Positioning System.....VII-2
3. Master Making System.....VII-4

[Removal & Assembly]
1. Thermal Print Head VII-7
2. TPH Pressure SW & TPH Home Position SW VII-8
3. Thermal Pressure Motor Ass'y VII-10
4. Write Roller.....VII-11

[Adjustment]
1. Thermal Power of Thermal Print Head (4200) VII-13
2. Thermal Power of Thermal Print Head (4900) VII-14
3. Thermal Power of Thermal Print Head (4300) VII-15
4. Thermal Power of Thermal Print Head (5900) VII-16
5. Master Making Length (Write Pulse Motor Operation Time) VII-17
6. Master Making Width..... VII-18
7. Thermal Power of Thermal Print Head <GR3750/2750/1750> VII-19-GR29
8. Thermal Power of Thermal Print Head <GR2710> VII-19-GR30
9. Thermal Power of Thermal Print Head <GR1700> VII-19-GR31
10. Master Making Width <GR> VII-19-GR32
11. Heating Rate of Thermal Print Head <GR>.....VII-19-GR33

8. Master Removal Section

[Theory of Operation]
1. Clamp Plate Opening System VIII-1
2. Master Removal System VIII-2
3. Master Removal System <GR>.....VIII-4-GR34
4. Master Removal Check System <GR> VIII-4-GR35

[Removal & Assembly]
1. Master Removal Unit (4200/4900) VIII-5
2. Master Removal Unit (5900) VIII-6
3. Master Removal Solenoid VIII-7
4. M.-Rmv. Vertical Transport Motor VIII-7
5. Master Removal Hook..... VIII-8
6. Vertical Transport Roller (Up).....VIII-8
7. Vertical Transport Roller (Down) VIII-9
8. Master Removal Sensors VIII-10
9. Master Sensor VIII-11
10. Master Removal Unit <GR1750/1700> VIII-12-GR36
11. Master Removal Unit <GR3750/2750/2710> VIII-12-GR37
12. Master Removal Hook Sensor <GR>..... VIII-12-GR38
13. Disposal Box Master Sensor (rcv.) <GR> VIII-12-GR38
14. Disposal Box Master Sensor (send) <GR3750/2750/2710> VIII-12-GR39
15. Disposal Box Master Sensor (send) <GR1750/1700> VIII-12-GR40
16. Master Removal Fan <GR> VIII-12-GR41

[Adjustment]
1. Projected Position of Master Removal Hooks VIII-13
2. Position of Disposal Box Set Sw VIII-14
3. Position of Master Removal Hook Sensor <GR> VIII-15-GR42

9. Master Clamp & Loading Sections

[Theory of Operation]
1. Master Clamping System IX-1
2. Master On-Drum Loading System.....IX-2
3. Master Post-Cutting Feeding System.....IX-6
4. Master Cutting System IX-7
5. Master Setting System IX-8
6. Master Free Feeding System IX-12
7. Post-Master Miscut Operation.....IX-14

[Removal & Assembly]
1. Clamp Unit..... IX-17
2. Clamp Motor.....IX-18
3. Clamp Solenoid IX-18
4. Master Loading Sensor IX-19
5. Cutter Motor Unit IX-20
6. Cutter Unit IX-21
7. Master Positioning Sensor IX-22
8. Master End/Det. Sensor IX-23
9. Master Loading Unit Sw IX-23
10. Master End Sensor (Receive) IX-24
11. Loading Fan IX-24
12. Cutter Unit <GR>.....IX-24-GR43
13. Loading Fan <GR3750>.....IX-24-GR44
14. Loading Fan <GR2750/2710/1750/1700>.....IX-24-GR44

[Adjustment]
1. Cutter Blade Stop Position IX-25
2. Position of 0°/180° Angular Sensors IX-26

Minor Changes from RA Series
1. Paper Ejection Section.....CHNG (GR)-1
2. Drum Section .....CHNG (GR)-1
3. Master Making Section.....CHNG (GR)-1
4. ADF Image Scanning Section.....CHNG (GR)-1
5. ADF & FB Image Scanning Sections .....CHNG (GR)-1
6. Master Removal Section .....CHNG (GR)-2
7. Master Clamp & Loading Sections .....CHNG (GR)-2

APPENDIX (I)
1. Test Mode
1. Operation Procedures .....APX (I)-1
2. Test Items and Operations .....APX (I)-3

2. Memory Switch ..... APX (I)-9
3. Users Mode ..... APX (I)-10
4. Advice Displays ..... APX (I)-11

APPENDIX (II)
1. Paper Jams
1. Paper Jam in the First Paper Feed Area.....APX (II)-1
2. Paper Jam in the Second Paper Feed Area / Paper Jam under the Drum.... APX (II)-1
3. Paper Jam at Paper Receiving Sensor 1 .....APX (II)-2
4. Paper Jam at Paper Receiving Sensor 2 .....APX (II)-2

- Timing Chart -
Paper Jam in the First Paper Feed Area.....APX (II)-3
Paper Jam in the Second Paper Feed Area & Under the Drum.....APX (II)-4
Paper Jam at Paper Receiving Sensor 1 .....APX (II)-5
Paper Jam at Paper Receiving Sensor 2 .....APX (II)-6

APPENDIX (III)
1. Description of PCBs
1. Block Chart (RA4200 & 4900) .....APX (III)-1
2. Block Chart (RA5900) .....APX (III)-2
3. Location of PCBs (RA4200 & 4900).....APX (III)-3
4. Location of PCBs (RA5900) .....APX (III)-4
5. Power Supply PCB.....APX (III)-5

6. System PCB .....APX (III)-7
7. Image Processing PCB (RA4200).....APX (III)-14
8. Image Processing PCB (RA4900).....APX (III)-17
9. Image Processing PCB (RA5900).....APX (III)-18
10. Trimming PCB (RA5900).....APX (III)-21
11. Drum Control PCB.....APX (III)-22
12. Motor Control PCB .....APX (III)-24
13. ADF PCB.....APX (III)-26
14. TPH Power PCB.....APX (III)-29
15. Flat Bed PCB (RA5900) .....APX (III)-31

APPENDIX (IV)

1. Test Mode <GR>
1. Operation Procedures ..... APX (IV)-1
2. Test Items and Operations ..... APX (IV)-3

2. Memory Switch <GR>..... APX (IV)-9
3. Users Mode <GR>..... APX (IV)-11
4. Master Making Width Adjustment <GR> ..... APX (IV)-14
5. Advice Displays <GR> ..... APX (IV)-15

APPENDIX (V)

1. Description of PCBs <GR>
1. Block Chart
(GR2750 & 3750) ..... APX (V)-1
(GR1700) ..... APX (V)-2
(GR1750) ..... APX (V)-3
(GR2710) ..... APX (V)-4
2. Location of PCBs
(GR2750 & 3750) ..... APX (V)-5
(GR1700 & 1750) ..... APX (V)-6
(GR2710) ..... APX (V)-7
3. System PCB2 ..... APX (V)-8
4. Image Processing PCB (IPDF)..... APX (V)-15
5. Image Processing PCB2 ..... APX (V)-18
6. Motor Control PCB2 ..... APX (V)-20
7. Drum Control PCB2..... APX (V)-22
8. ADF PCB..... APX (V)-24
9. Flat Bed PCB..... APX (V)-26
10. Trimming PCB2 (GR2750/3750) ..... APX (V)-28
11. Option PCB ..... APX (V)-29
12. LCD Control PCB ..... APX (V)-31
13. LED Control PCB ..... APX (V)-33
14. Power Supply PCB..... APX (V)-35
15. TPH Power PCB..... APX (V)-41

INDEX

Integral Circuit Diagrams

Integral Circuit Diagram (RA4200)
Integral Circuit Diagram (RA4900)
Integral Circuit Diagram (RA5900)

Integral Circuit Diagrams <GR>

Integral Circuit Diagram (GR1700)
Integral Circuit Diagram (GR1750)
Integral Circuit Diagram (GR2710)
Integral Circuit Diagram (GR2750/3750)

CONTENTS for GR models only

SPECIFICATIONS

4. GR3750 ..... SPC(GR)-1
5. GR2750 ..... SPC(GR)-3
6. GR2710 ..... SPC(GR)-5
7. GR1750 ..... SPC(GR)-7
8. GR1700 ..... SPC(GR)-8

SECTIONIZED DESCRIPTIONS

1. Paper Feed Section
[Theory of Operation]
10. Paper Pickup System <GR> I-13-GR1
15. Stripper Unit <GR>..... I-26-GR2
16. Stripper Sheet <GR>..... I-26-GR3
17. Paper Feed Clutch Ass'y <GR> I-26-GR4
[Adjustment]
9. Position of P Disc (Start-time of First Paper Feed) <GR>..... I-37-GR5

2. Press/Rotation Section
[Theory of Operation]
4. Pressure Regulation System <GR> II-5-GR6
[Removal & Assembly]
8. Main Motor Unit <GR> II-13-GR8
[Adjustment]
7. Standard Pressure Position <GR> II-23-GR9

3. Paper Ejection Section
[Theory of Operation]
4. Paper Separation System <GR>..... III-6-GR10
5. Paper Ejection System <GR> III-6-GR11
6. Paper Receiving System <GR> III-6-GR12
[Removal & Assembly]
11. Separator <GR> III-16-GR13
12. Separation Air Pump <GR>..... III-16-GR14
13. Suction Clutch <GR>..... III-16-GR15
14. Separation Fan <GR-A3/Ledger> III-16-GR16
15. Separation Fan <GR-B4/A4/Letter> III-16-GR17
[Adjustment]
2. Position of Separator <GR> III-18-GR18
3. Air Power Adjustment of Separation Fan <GR> III-18-GR19

4. Drum Section
[Removal & Assembly]
13. Ink Bottle Sw Ass'y <GR> IV-20-GR20
14. Screens <GR-A3/Ledger>.....IV-20-GR21
15. Screens <GR-B4/A4/Legal>.....IV-20-GR22
[Adjustment]
5. Squeegee Gap <GR>..... IV-25-GR23

5. ADF Image Scanning Section
[Removal & Assembly]
18. Shading Sheet <GR1750/1700> V-18-GR24

6. Flat Bed Image Scanning Section
[Theory of Operation]
9. Image Scanning System - in Auto Scanning Contrast Adjustment Mode <GR>..... VI-16-GR25
10. ADF Image Scanning System - in Auto Scanning Contrast Adjustment Mode <GR> . VI-16-GR26

7. Master Making Section
[Adjustment]
7. Thermal Power of Thermal Print Head <GR3750/2750/1750> VII-19-GR29
8. Thermal Power of Thermal Print Head <GR2710> VII-19-GR30
9. Thermal Power of Thermal Print Head <GR1700> VII-19-GR31
10. Master Making Width <GR> VII-19-GR32
11. Heating Rate of Thermal Print Head <GR>.....VII-19-GR33

8. Master Removal Section
[Theory of Operation]
3. Master Removal System <GR>.....VIII-4-GR34
4. Master Removal Check System <GR> VIII-4-GR35
[Removal & Assembly]
10. Master Removal Unit <GR1750/1700> VIII-12-GR36
11. Master Removal Unit <GR3750/2750/2710> VIII-12-GR37
12. Master Removal Hook Sensor <GR>..... VIII-12-GR38
13. Disposal Box Master Sensor (rcv.) <GR> VIII-12-GR38
14. Disposal Box Master Sensor (send) <GR3750/2750/2710> VIII-12-GR39
15. Disposal Box Master Sensor (send) <GR1750/1700> VIII-12-GR40
16. Master Removal Fan <GR> VIII-12-GR41
[Adjustment]
3. Position of Master Removal Hook Sensor <GR> VIII-15-GR42
9. Master Clamp & Loading Sections
[Removal & Assembly]
12. Cutter Unit <GR>.....IX-24-GR43
13. Loading Fan <GR3750>.....IX-24-GR44
14. Loading Fan <GR2750/2710/1750/1700>.....IX-24-GR44

Minor Changes from RA Series

1. Paper Ejection Section.....CHNG (GR)-1
2. Drum Section .....CHNG (GR)-1
3. Master Making Section.....CHNG (GR)-1
4. ADF Image Scanning Section.....CHNG (GR)-1
5. ADF & FB Image Scanning Sections .....CHNG (GR)-1
6. Master Removal Section .....CHNG (GR)-2
7. Master Clamp & Loading Sections .....CHNG (GR)-2

APPENDIX (IV)

1. Test Mode <GR>
1. Operation Procedures ..... APX (IV)-1
2. Test Items and Operations ..... APX (IV)-3
2. Memory Switch <GR>..... APX (IV)-9
3. Users Mode <GR>..... APX (IV)-11
4. Master Making Width Adjustment <GR> ..... APX (IV)-14
5. Advice Displays <GR> ..... APX (IV)-15

APPENDIX (V)

1. Description of PCBs <GR>
1. Block Chart..... APX (V)-1
2. Location of PCBs..... APX (V)-5
3. System PCB2 ..... APX (V)-8
4. Image Processing PCB (IPDF)..... APX (V)-15
5. Image Processing PCB2 ..... APX (V)-18
6. Motor Control PCB2 ..... APX (V)-20
7. Drum Control PCB2..... APX (V)-22
8. ADF PCB..... APX (V)-24
9. Flat Bed PCB..... APX (V)-26
10. Trimming PCB2 (GR2750/3750) ..... APX (V)-28
11. Option PCB ..... APX (V)-29
12. LCD Control PCB ..... APX (V)-31
13. LED Control PCB ..... APX (V)-33
14. Power Supply PCB..... APX (V)-35
15. TPH Power PCB..... APX (V)-41

INDEX

Integral Circuit Diagrams <GR>

Integral Circuit Diagram (GR1700)
Integral Circuit Diagram (GR1750)
Integral Circuit Diagram (GR2710)
Integral Circuit Diagram (GR2750/3750)

Specifications

1. RA4200

- **Processing** — High-speed automatic digital scanning
  Fully automatic, thermal screening duplicating system
- **Time to First Copy** — Approx. 17 seconds(letter, or A4 original)
- **Print Speed** — 5 selectable print speeds (60, 80, 100, 120, 130 sheets/min.)
- **Scanning Resolution** — 300 dpi (300dpi <Lateral> x400 dpi <Vertical>)
- **Original Type** — Sheets
- **Original Size** — Max./ A3 (297 x 431mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x148mm) or 4 x 6 inch
- **Paper Size** — Max./ A3 (297 x 431mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Original Weight** — Max./ 120 g/m^2 or 32-lb bond
  Min./ 50 g/m^2 or 15-lb bond
- **Paper Weight** — Max./ 210 g/m^2 or 110-lb index
  Min./ 46 g/m^2 or 13-lb bond
- **Image Area** — B4 Drum / 245 x 350mm
  A4 Drum / 195 x 288mm
  Legal Drum / 7.8 x 13.7 inch
- **Paper Capacity** — 1000 sheets in feed and receiving tray
  [Based on 64 g/m^2 (16-lb bond) paper]
- **ADF Capacity** — 50 originals
- **Machine Weight** — Approx. 87 kg (192 lbs.)
- **Dimensions** [W x D x H] — In use / 1360 x 631 x 589mm
  53.5 x 24.8 x 23.2 inch
  In storage / 650 x 631 x 606mm
  25.6 x 24.8 x 23.9 inch
- **Power Source** <Requirements> — Picture Model: 220 to 240 VAC, 50/60 Hz <3.0A>
  USA Model: 120 VAC, 60 Hz <3.5A>
  Metric Models: 110 VAC, 60 Hz <3.5A> - 110-V model
  220 to 240 VAC, 50/60 Hz <3.0A> - 220-V model
- **Reduction Parameters** — 4 selectable reductions (94%, 87%, 82% and 71%)
  [94%, 77%, 75% and 66% in USA models]
- **Features** — Speed control, Confidential mode, Photo enhancement, Automatic idle
  ADF and Scanning contrast adjustment
- **Print Colors** — Six colors available as optional accessories
  (black, blue, red, green, brown and yellow)
- **Optional Accessories** — Color drum unit, Sorter TM2400 and Job separator

2. RA4900

- **Processing** — High-speed automatic digital scanning
  Fully automatic, thermal screening duplicating system
- **Time to First Copy** — Approx. 17 seconds(letter, or A4 original)
- **Print Speed** — 5 selectable print speeds (60, 80, 100, 120, 130 sheets/min.)
- **Scanning Resolution** — 400 dpi
- **Original Type** — Sheets
- **Original Size** — Max./ A3 (297 x 431mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x148mm) or 4 x 6 inch
- **Paper Size** — Max./ A3 (297 x 431mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Original Weight** — Max./ 120 g/m^2 or 32-lb bond
  Min./ 50 g/m^2 or 15-lb bond
- **Paper Weight** — Max./ 210 g/m^2 or 110-lb index
  Min./ 46 g/m^2 or 13-lb bond
- **Image Area** — B4 Drum / 245 x 350mm
  A4 Drum / 195 x 288mm
  Legal Drum / 7.8 x 13.7 inch
- **Paper Capacity** — 1000 sheets in feed and receiving tray
  [Based on 64 g/m^2 (16-lb bond) paper]
- **ADF Capacity** — 50 originals
- **Machine Weight** — Approx. 87 kg (192 lbs.)
- **Dimensions** [W x D x H] — In use / 1360 x 631 x 589mm
  53.5 x 24.8 x 23.2 inch
  In storage / 650 x 631 x 606mm
  25.6 x 24.8 x 23.9 inch
- **Power Source** <Requirements>

Picture Model:	220 to 240 VAC, 50/60 Hz <3.0A>
USA Model:	120 VAC, 60 Hz <3.5A>
Metric Models:	110 VAC, 60 Hz <3.5A> - 110-V model
	220 to 240 VAC, 50/60 Hz <3.0A> - 220-V model

- **Reduction Parameters** — 4 selectable reductions (94%, 87%, 82% and 71%)
  [94%, 77%, 75% and 66% in USA models]
- **Enlargement Parameters** — 3 selectable enlargements (141%, 122% and 116%)
  [141%, 127% and 121% in USA models]
- **Zooming Parameters** — 50% to 200%
- **Features** — Print speed/ density control, Confidential mode, Two-up printing,
  Programmed printing, Memory storage of frequently used settings,
  Fine enhance, Dot-screening, Interface capabilities, Photo
  enhancement, Automatic idle, ADF and Scanning contrast adjustment
- **Print Colors** — Six colors available as optional accessories
  (black, blue, red, green, brown and yellow)
- **Optional Accessories** — Color drum unit, Sorter TM2400, Key Card counter and Job separator

3. RA5900

- **Processing** — High-speed automatic digital scanning
  Fully automatic, thermal screening duplicating system
- **Time to First Copy** — Approx. 17 seconds (Letter, or A4 original)
- **Print Speed** — 5 selectable print speeds (60, 80, 100, 120, 130 sheets/min.)
- **Scanning Resolution** — 400 dpi
- **Original Type** — Bound documents or sheets
- **Original Size**
  - **For the Stage Glass:**
    Max./ A3 (297 x 431mm) or Ledger (11 x 17 inch)
    Min./ Business card (55 x 90mm) or 2 1/8 x 3 1/2 inch
  - **In the optional ADF Unit:**
    Max./ A3 (297 x 431mm) or Ledger (11 x 17 inch)
    Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Paper Size** — Max./ A3 (297 x 431mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Original Weight**
  - **For the Stage Glass:**
    2,2 kg (4.4 lbs.) or less
  - **In the optional ADF Unit:**
    Max./ 120 g/m^2 or 32-lb bond
    Min./ 50 g/m^2 or 15-lb bond
- **Paper Weight** — Max./ 210 g/m^2 or 110-lb index
  Min./ 46 g/m^2 or 13-lb bond
- **Image Area** — B4 Drum / 245 x 350mm
  A4 Drum / 195 x 288mm
  Legal Drum / 7.8 x 13.7 inch
- **Paper Capacity** — 1000 sheets in feed and receiving tray
  [Based on 64 g/m^2 (16-lb bond) paper]
- **Optional ADF Capacity** — 50 originals
- **Machine Weight** — Approx. 104 kg (229 lbs.)
  <Approx. 107 kg (236 lbs.) with the optional ADF unit installed>
- **Dimensions** [W x D x H]
  In use / 1295 x 665 x 631mm
  51.0 x 26.2 x 24.8 inch
  In storage / 650x 665 x 631mm
  25.6 x 26.2 x 24.8 inch
  - **With the optional ADF unit installed:**
    In use / 1295 x 665 x 820mm
    51.0 x 26.2 x 32.3 inch
    In storage / 697 x 665 x 702mm
    27.4 x 26.2 x 27.6 inch
- **Power Source** <Requirements>
  Picture Model: 220 to 240 VAC, 50/60 Hz <3.0A>
  USA Model: 120 VAC, 60 Hz <3.5A>
  Metric Models: 110 VAC, 60 Hz <3.5A> - 110-V model
  220 to 240 VAC, 50/60 Hz <3.0A> - 220-V model

- **Reduction Parameters** 4 selectable reductions (94%, 87%, 82% and 71%)
  [94%, 77%, 75% and 66% in USA models]
- **Enlargement Parameters** 3 selectable enlargements (141%, 122% and 116%)
  [141%, 127% and 121% in USA models]
- **Zooming Parameters** 50% to 200%
- **Features** Print speed/ density control, Confidential mode, Two-up printing, Bound Book processing, Programmed printing, Memory storage of frequently used settings, Fine enhance, Dot-screening, Interface capabilities, Photo enhancement, Automatic idle, ADF and Scanning contrast adjustment
- **Print Colors** Six colors available as optional accessories (black, blue, red, green, brown and yellow)
- **Optional Accessories** Color drum unit, ADF unit, Digitizer, Sorter TM2400, Key Card counter and Job separator

4. GR3750

- **Processing**
  High-speed automatic digital scanning
  Fully automatic, thermal screening duplicating system
- **Time to First Copy**
  Letter or A4 original / Approx. 17 seconds
  Ledger or A3 original / Approx. 23 seconds
- **Print Speed**
  5 selectable print speeds (60, 80, 100, 110, 120 sheets/min.)
- **Scanning Resolution**
  400 dpi
- **Original Type**
  Bound documents or sheets
- **Original Size**
  - **For the Stage Glass:**
    Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
    Min./ Business card (50 x 90mm) or 2 1/8 x 3 1/2 inch
  - **In the optional ADF Unit:**
    Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
    Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Paper Size**
  Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Original Weight**
  - **For the Stage Glass:**
    10 kg (22 lbs.) or less
  - **In the optional ADF Unit:**
    Max./ 107 g/m^2 or 28-lb bond
    Min./ 50 g/m^2 or 15-lb bond
- **Paper Weight**
  Max./ 209 g/m^2 or 110-lb index
  Min./ 50 g/m^2 or 15-lb bond
- **Image Area**
  A3 Drum / 290 x 412mm
  Ledger Drum / 10.7 x 16.5 inch
- **Paper Capacity**
  1000 sheets in feed and receiving tray
  [Based on 64 g/m^2 (16-lb bond) paper]
- **Optional ADF Capacity**
  50 originals
- **Machine Weight**
  Approx. 115 kg (254 lbs.)
  <Approx. 118 kg (260 lbs.) with the optional ADF unit installed>
- **Dimensions**
  [W x D x H]
  In use / 1290 x 669 x 634mm
  51.0 x 26.0 x 25.0 inch
  In storage / 720 x 669 x 634mm
  28.0 x 26.0 x 25.0 inch
  - **With the optional ADF unit installed:**
    In use / 1290 x 669 x 829mm
    51.0 x 26.0 x 32.6 inch
    In storage / 745 x 669 x 694mm
    29.3 x 26.0 x 27.3 inch
- **Power Source**
  <Requirements>
  Picture Model: 220 to 240 VAC, 50/60 Hz <3.0A>
  USA Model: 120 VAC, 60 Hz <5.0A>
  Metric Models: 110 VAC, 60 Hz <5.0A> - 110-V model
  220 to 240 VAC, 50/60 Hz <3.0A> - 220-V model

- **Reduction Parameters** — 4 selectable reductions (94%, 87%, 82% and 71%) [94%, 77%, 75% and 66% in USA models]
- **Enlargement Parameters** — 3 selectable enlargements (141%, 122% and 116%) [141%, 127% and 121% in USA models]
- **Zooming Parameters** — 50% to 200%
- **Features** — LCD monitor, Print speed/density control, Confidential mode, Two-up printing, Book document processing, Programmed printing, Memory mode, Fine enhance mode, Dot screen mode, Interface capabilities, Photo mode, Automatic idle and Automatic scanning contrast adjustment
- **Print Colors** — Black, blue, red, green, brown and yellow
- **Optional Accessories** — Color drum unit, A4 drum unit, ADF unit, Digitizer, TM2400 sorter, Sheet feeder SF3000, Key/Card counter, Job separator and Computer interface

5. GR2750

- **Processing**
  High-speed automatic digital scanning
  Fully automatic, thermal screening duplicating system
- **Time to First Copy**
  Letter or A4 original / Approx. 17 seconds
  Ledger or A3 original / Approx. 23 seconds
- **Print Speed**
  5 selectable print speeds (60, 80, 100, 120, 130 sheets/min.)
- **Scanning Resolution**
  400 dpi
- **Original Type**
  Bound documents or sheets
- **Original Size**
  - **For the Stage Glass:**
    Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
    Min./ Business card (50 x 90mm) or 2 1/8 x 3 1/2 inch
  - **In the optional ADF Unit:**
    Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
    Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Paper Size**
  Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Original Weight**
  - **For the Stage Glass:**
    10 kg (22 lbs.) or less
  - **In the optional ADF Unit:**
    Max./ 107 g/m^2 or 28-lb bond
    Min./ 50 g/m^2 or 15-lb bond
- **Paper Weight**
  Max./ 209 g/m^2 or 110-lb index
  Min./ 50 g/m^2 or 15-lb bond
- **Image Area**
  B4 Drum / 250 x 355mm
  A4 Drum / 198 x 286mm
  Legal Drum / 7.8 x 13.6 inch
- **Paper Capacity**
  1000 sheets in feed and receiving tray
  [Based on 64 g/m^2 (16-lb bond) paper]
- **Optional ADF Capacity**
  50 originals
- **Machine Weight**
  Approx. 102 kg (225 lbs.)
  <Approx. 105 kg (231 lbs.) with the optional ADF unit installed>
- **Dimensions**
  [W x D x H]
  In use / 1290 x 653 x 640mm
  51.0 x 26.0 x 25.0 inch
  In storage / 720x 653 x 640mm
  28.3 x 26.0 x 25.0 inch
  - **With the optional ADF unit installed:**
    In use / 1290 x 653 x 829mm
    51.0 x 26.0 x 33.0 inch
    In storage / 720 x 653 x 711mm
    28.0 x 26.0 x 28.0inch
- **Power Source**
  <Requirements>
  Picture Model: 220 to 240 VAC, 50/60 Hz <3.0A>
  USA Model: 120 VAC, 60 Hz <5.0A>
  Metric Models: 110 VAC, 60 Hz <5.0A> - 110-V model
  220 to 240 VAC, 50/60 Hz <3.0A> - 220-V model

- **Reduction Parameters** 4 selectable reductions (94%, 87%, 82% and 71%)
  [94%, 77%, 75% and 66% in USA models]
- **Enlargement Parameters** 3 selectable enlargements (141%, 122% and 116%)
  [141%, 127% and 121% in USA models]
- **Zooming Parameters** 50% to 200%
- **Features** LCD monitor, Print speed/density control, Confidential mode, Two-up printing, BooK document processing, Programmed printing, Memory mode, Fine enhance mode, Dot screen mode, Interface capabilities, Photo mode, Automatic idle and Automatic scanning contrast adjustment
- **Print Colors** Black, blue, red, green, brown and yellow
- **Optional Accessories** Color drum unit, ADF unit, Digitizer, TM2400 sorter, Sheet feeder SF3000, Key/Card counter, Job separator and Computer interface

6. GR2710

- **Processing**
  High-speed automatic digital scanning
  Fully automatic, thermal screening duplicating system
- **Time to First Copy**
  Letter or A4 original / Approx. 17 seconds
  Ledger or A3 original / Approx. 23 seconds
- **Print Speed**
  5 selectable print speeds (60, 80, 100, 120, 130 sheets/min.)
- **Scanning Resolution**
  300 dpi (300 dpi <Lateral> x 400 dpi <Vertical>)
- **Original Type**
  Bound documents or sheets
- **Original Size**
  - **For the Stage Glass:**
    Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
    Min./ Business card (50 x 90mm) or 2 1/8 x 3 1/2 inch
  - **In the optional ADF Unit:**
    Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
    Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Paper Size**
  Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Original Weight**
  - **For the Stage Glass:**
    10 kg (22 lbs.) or less
  - **In the optional ADF Unit:**
    Max./ 107 g/m^2 or 28-lb bond
    Min./ 50 g/m^2 or 15-lb bond
- **Paper Weight**
  Max./ 209 g/m^2 or 110-lb index
  Min./ 50 g/m^2 or 15-lb bond
- **Image Area**
  B4 Drum / 250 x 355mm
  A4 Drum / 198 x 286mm
  Legal Drum / 7.8 x 13.6 inch
- **Paper Capacity**
  1000 sheets in feed and receiving tray
  [Based on 64 g/m^2 (16-lb bond) paper]
- **Optional ADF Capacity**
  50 originals
- **Machine Weight**
  Approx. 102 kg (225 lbs.)
  <Approx. 105 kg (231 lbs.) with the optional ADF unit installed>
- **Dimensions**
  [W x D x H]
  In use / 1290 x 653 x 640mm
  51.0 x 26.0 x 25.0 inch
  In storage / 720 x 653 x 640mm
  28.0 x 26.0 x 25.0 inch
  - **With the optional ADF unit installed:**
    In use / 1290 x 653 x 829mm
    51.0 x 26.0 x 33.0 inch
    In storage / 720 x 653 x 711mm
    28.3 x 26.0 x 28.0 inch
- **Power Source**
  <Requirements>
  Picture Model: 220 to 240 VAC, 50/60 Hz <3.0A>
  USA Model: 120 VAC, 60 Hz <5.0A>
  Metric Models: 110 VAC, 60 Hz <5.0A> - 110-V model
  220 to 240 VAC, 50/60 Hz <3.0A> - 220-V model

- **Reduction Parameters** — 4 selectable reductions (94%, 87%, 82% and 71%) [94%, 77%, 75% and 66% in USA models]
- **Features** — Print speed control, Confidential mode, Two-up printing, Programmed printing, Memory mode, Interface capabilities, Photo mode, Automatic idle and Scanning contrast adjustment
- **Print Colors** — Black, blue, red, green, brown and yellow
- **Optional Accessories** — Color drum unit, ADF unit, TM2400 sorter, Sheet feeder SF3000, Key/ Card counter, Job separator and Computer interface

7. GR1750

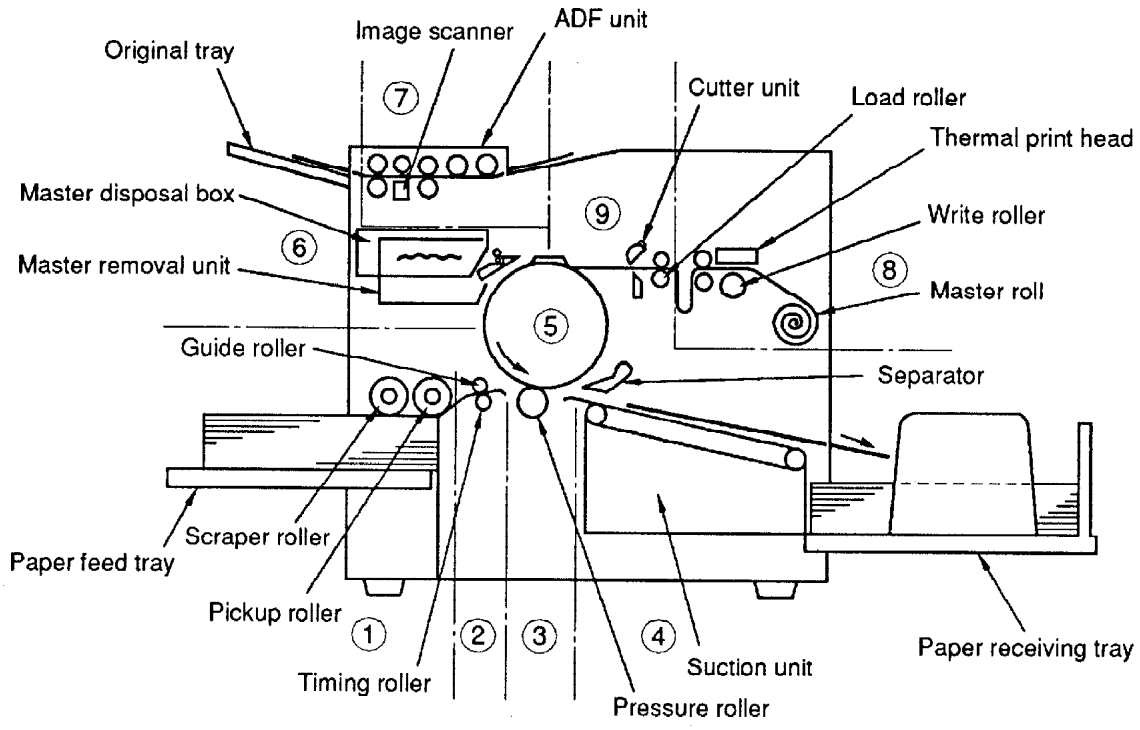
- **Processing** — High-speed automatic digital scanning
  Fully automatic, thermal screening duplicating system
- **Time to First Copy** — Letter or A4 original / Approx. 17 seconds
  Ledger or A3 original / Approx. 23 seconds
- **Print Speed** — 5 selectable print speeds (60, 80, 100, 120, 130 sheets/min.)
- **Scanning Resolution** — 400 dpi
- **Original Type** — Sheets
- **Original Size** — Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Paper Size** — Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Original Weight** — Max./ 110 g/m^2 or 28-lb bond
  Min./ 50 g/m^2 or 15-lb bond
- **Paper Weight** — Max./ 209 g/m^2 or 110-lb index
  Min./ 50 g/m^2 or 15-lb bond
- **Image Area** — B4 Drum / 250 x 355mm
  A4 Drum / 198 x 286mm
  Legal Drum / 7.8 x 13.6 inch
- **Paper Capacity** — 1000 sheets in feed and receiving tray
  [Based on 64 g/m^2 (16-lb bond) paper]
- **ADF Capacity** — 50 originals
- **Machine Weight** — Approx. 92 kg (203 lbs.)
- **Dimensions**
  [W x D x H] — In use / 1364 x 619 x 583mm
  53.7 x 24.4 x 23.0 inch
  In storage / 745 x 619 x 602mm
  29.3 x 24.4 x 23.7 inch
- **Power Source**
  <Requirements> — Picture Model: 220 to 240 VAC, 50/60 Hz <3.0A>
  USA Model: 120 VAC, 60 Hz <5.0A>
  Metric Models: 110 VAC, 60 Hz <5.0A> - 110-V model
  220 to 240 VAC, 50/60 Hz <3.0A> - 220-V model
- **Reduction Parameters** — 4 selectable reductions (94%, 87%, 82% and 71%)
  [94%, 77%, 75% and 66% in USA models]
- **Enlargement Parameters** — 3 selectable enlargements (141%, 122% and 116%)
  [141%, 127% and 121% in USA models]
- **Zooming Parameters** — 50% to 200%
- **Features** — Print speed/density control, Confidential mode, Two-up printing, Programmed printing, Memory mode, Fine enhance mode, Dot screen mode, Interface capabilities, Photo mode, Automatic idle, ADF and Scanning contrast adjustment
- **Print Colors** — Black, blue, red, green, brown and yellow
- **Optional Accessories** — Color drum unit, TM2400 sorter, Sheet feeder SF3000, Key/Card counter, Job separator & Computer interface

8. GR1700

- **Processing** — High-speed automatic digital scanning
  Fully automatic, thermal screening duplicating system
- **Time to First Copy** — Letter or A4 original / Approx. 17 seconds
  Ledger or A3 original / Approx. 23 seconds
- **Print Speed** — 5 selectable print speeds (60, 80, 100, 120, 130 sheets/min.)
- **Scanning Resolution** — 300 dpi (300 dpi <Lateral> x 400 dpi <Vertical>)
- **Original Type** — Sheets
- **Original Size** — Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Paper Size** — Max./ A3 (297 x 420mm) or Ledger (11 x 17 inch)
  Min./ A6 (100 x 148mm) or 4 x 6 inch
- **Original Weight** — Max./ 110 g/m^2 or 28-lb bond
  Min./ 50 g/m^2 or 15-lb bond
- **Paper Weight** — Max./ 209 g/m^2 or 110-lb index
  Min./ 50 g/m^2 or 15-lb bond
- **Image Area** — B4 Drum / 250 x 355mm
  A4 Drum / 198 x 286mm
  Legal Drum / 7.8 x 13.6 inch
- **Paper Capacity** — 1000 sheets in feed and receiving tray
  [Based on 64 g/m^2 (16-lb bond) paper]
- **ADF Capacity** — 50 originals
- **Machine Weight** — Approx. 92 kg (203 lbs.)
- **Dimensions** [W x D x H] — In use / 1364 x 619 x 583mm
  53.7 x 24.4 x 23.0 inch
  In storage / 745 x 619 x 602mm
  29.3 x 24.4 x 23.7 inch
- **Power Source** <Requirements> — Picture Model: 220 to 240 VAC, 50/60 Hz <3.0A>
  USA Model: 120 VAC, 60 Hz <5.0A>
  Metric Models: 110 VAC, 60 Hz <5.0A> - 110-V model
  220 to 240 VAC, 50/60 Hz <3.0A> - 220-V model
- **Reduction Parameters** — 4 selectable reductions (94%, 87%, 82% and 71%)
  [94%, 77%, 75% and 66% in USA models]
- **Features** — Print speed control, Confidential mode, Two-up printing, Programmed printing, Memory mode, Interface capabilities, Photo mode, Automatic idle, ADF and Scanning contrast adjustment
- **Print Colors** — Black, blue, red, green, brown and yellow
- **Optional Accessories** — Color drum unit, TM2400 sorter, Sheet feeder SF3000, Key/Card counter, Job separator and Computer interface

1. Cross Sectional View

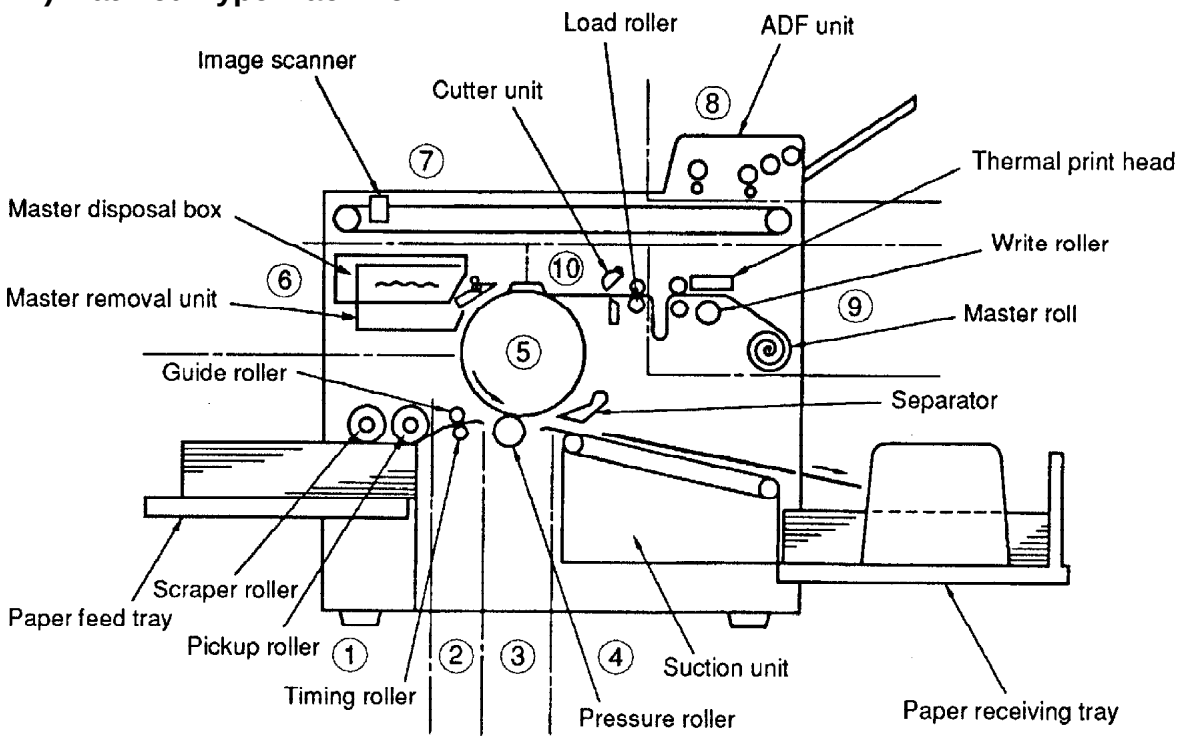
1) Sheet Type Machine



① First Paper Feed Area:	Feeds single sheets of paper to the second paper feed area via the Scraper roller, Pickup roller and Stripper plate.
② Second Paper Feed Area:	Controls the vertical print position and feeds paper to the print area via the Timing and Guide rollers.
③ Print Area:	Uses the Pressure roller to press paper against the master on the Drum. The Drum rotates with the Pressure roller and prints an image on paper.
④ Paper Ejection Area:	Separates a printed paper from the Drum, and transports it onto the paper receiving tray.
⑤ Drum Area:	Supplies the Drum surface with ink from an Ink pack.
⑥ Master Disposal Area:	Separates a used master from the Drum and disposes it into the Master disposal box.
⑦ Image Scanning Area:	Carries an original and scans it with the Image scanner and converts the image information into digital data.
⑧ Master Making Area:	Makes a master with the Thermal print head.
⑨ Carrier and Clamp Area:	Feeds the prepared master material to the Drum, loads it on the Drum, and cuts it to an appropriate length.

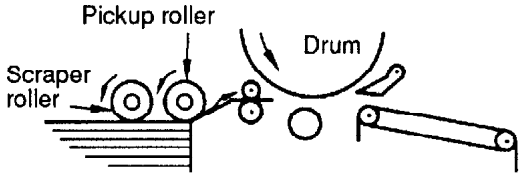
1. Cross Sectional View
2) Flat Bed Type Macine

2) Flat Bed Type Machine

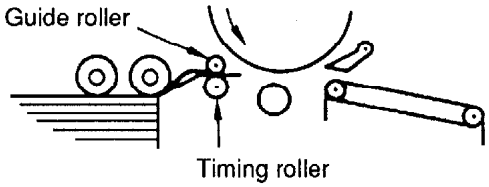


① First Paper Feed Area:	Feeds single sheets of paper to the second paper feed area via the Scraper roller, Pickup roller and Stripper plate.
② Second Paper Feed Area:	Controls the vertical print position and feeds paper to the print area via the Timing and Guide rollers.
③ Print Area:	Uses the Pressure roller to press paper against the master on the Drum. The Drum rotates with the Pressure roller and prints an image on paper.
④ Paper Ejection Area:	Separates a printed paper from the Drum, and transports it onto the paper receiving tray.
⑤ Drum Area:	Supplies the Drum surface with ink from an Ink pack.
⑥ Master Disposal Area:	Separates a used master from the Drum and disposes it into the Master disposal box.
⑦ FB Image Scanning Area:	Scans an original on the Stage glass by moving the Image scanner and converts the image information into digital data.
⑧ ADF Image Scanning Area:	Carries an original and scans it with the Image scanner and converts the image information into digital data.
⑨ Master Making Area:	Makes a master with the Thermal print head.
⑩ Carrier and Clamp Area:	Feeds the prepared master material to the Drum, loads it on the Drum, and cuts it to an appropriate length.

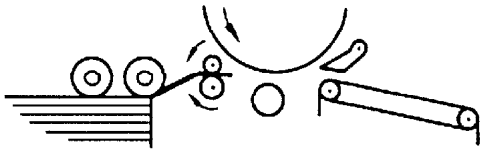
2. Paper Feed and Receiving



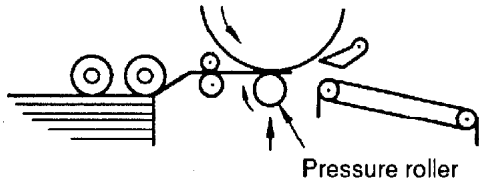
The Drum is rotated and a sheet of paper is fed from the first paper feed area to the second paper feed area by the Scraper and Pickup rollers.



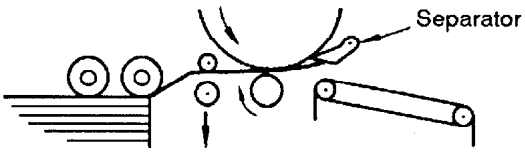
The paper feed to the second paper feed area is stopped by the Guide and Timing rollers to form a buckle. The paper then waits until the rotation of the Guide roller starts.



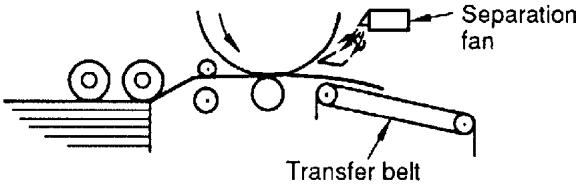
The Guide and Timing rollers in the second paper feed area are rotated and the paper is fed to the printing area.



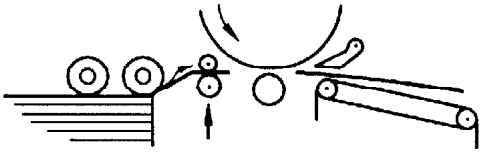
While the paper is being fed from the second paper feed area, the Pressure roller rises and printing starts.
(The Pressure roller contacts the Drum and starts rotating.)



After the Pressure roller contacts the Drum to start printing, the Separator approaches the Drum and the Timing roller goes down.
(The paper is then transferred by the rotation of the Drum.)

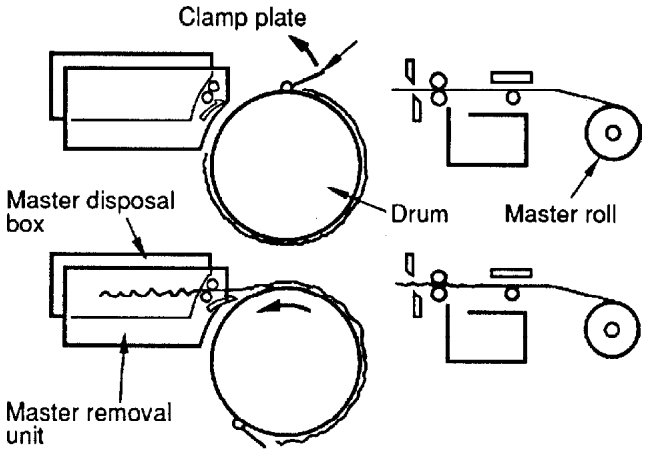


The printed paper is separated from the Drum by the Separator and with a help of the air blow from the Separation fan and is transported onto the Paper receiving tray by the Transfer belts using the Suction fan.



The Timing roller contacts the Guide roller to feed the next sheet of paper.

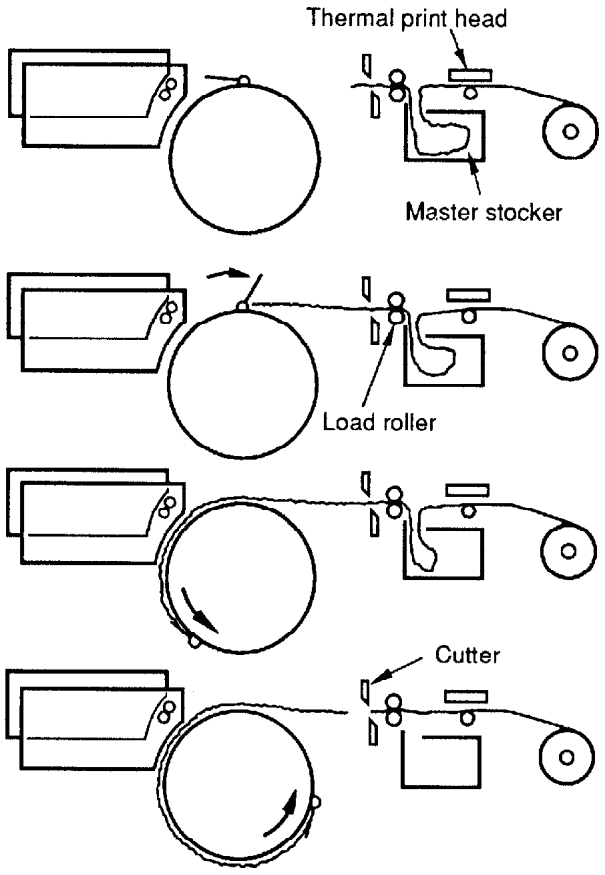
3. Master Removal and Feed



Master Removal

When the "START" button is pressed for master-making, the Drum is rotated to the home position and the Clamp plate is opened.

The Maser removal hooks are activated, and the Drum is rotated a turn to remove a used master into the Master disposal box.



Master Making

At the same timethe used master is removed from the Drum, the Image scanner scans an original and the Thermal print head makes a new master and stocks the new made master in the Master stocker.

Master Loading

The lead edge of the master advances to the Drum, and the Clamp plate is closed to hold the master.

The Drum rotates to load the master on itself.

Master loading continues until the prime surface of the Drum is covered, and then the Cutter cuts the master while the Drum still rotating.

1. Paper Feed Section

[Theory of Operation]

1. Paper Feed Tray Mechanism

- Basic

The Paper feed tray holds paper and the Paper detection sensor checks paper presence on the tray.

- Paper Positioning

The Paper feed tray can be shifted in both left and right directions by maximum 20mm (5mm for A3 or Ledger size paper, by manually turning the Adjustment dial.

The Adjustment dial is attached at the end of the Adjustment shaft A, which is rotated by the turn of the dial. By the rotation of the shaft, the Adjustment nut, which engages with the screw-face of the shaft, is moved to the left or right, causing the tray to move to the left or right.

- Paper Side Guides Movement

The Paper side guides can be manually adjusted to the width of paper.

Sliding either of the two Paper side guides toward loaded paper centers the paper on the tray by moving the other side guide inward.

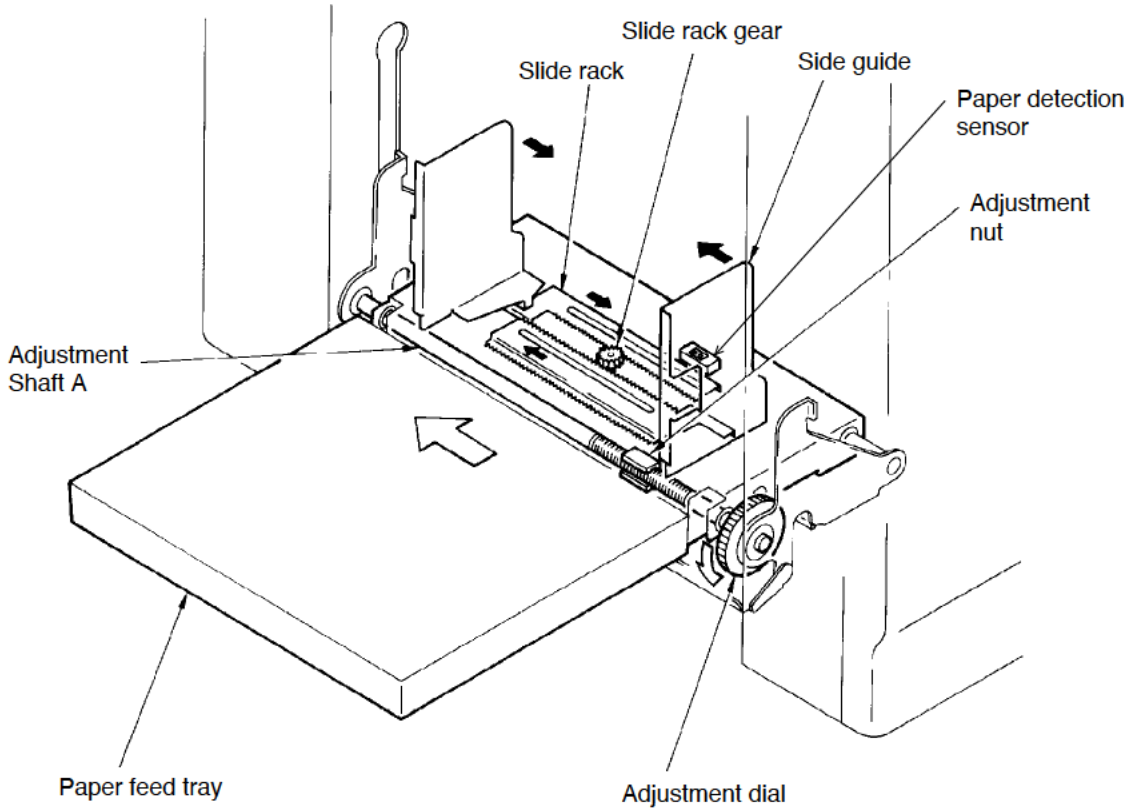
The Paper side guides have the Slide racks attached, which are linked by the Slide rack gear.

The movement of one side guide is transmitted to the other one by the racks and gear, enabling their synchronized movement.

- Paper Detection Sensor Function

The Paper detection sensor checks the presence of paper on the Paper feed tray.

The machine goes into the printing mode only when paper is present on the Paper feed tray.



2. Paper Feed Tray Elevation System

- Basic

The Paper feed tray can move up and down depending upon the function selected.

- Paper Detection Sensor

The Paper detection sensor checks whether the paper is set on the Paper feed tray.
The START button is only active when the paper detection sensor detects the paper on the Tray (the sensor's light is reflected back).

- Elevation of Feed Tray

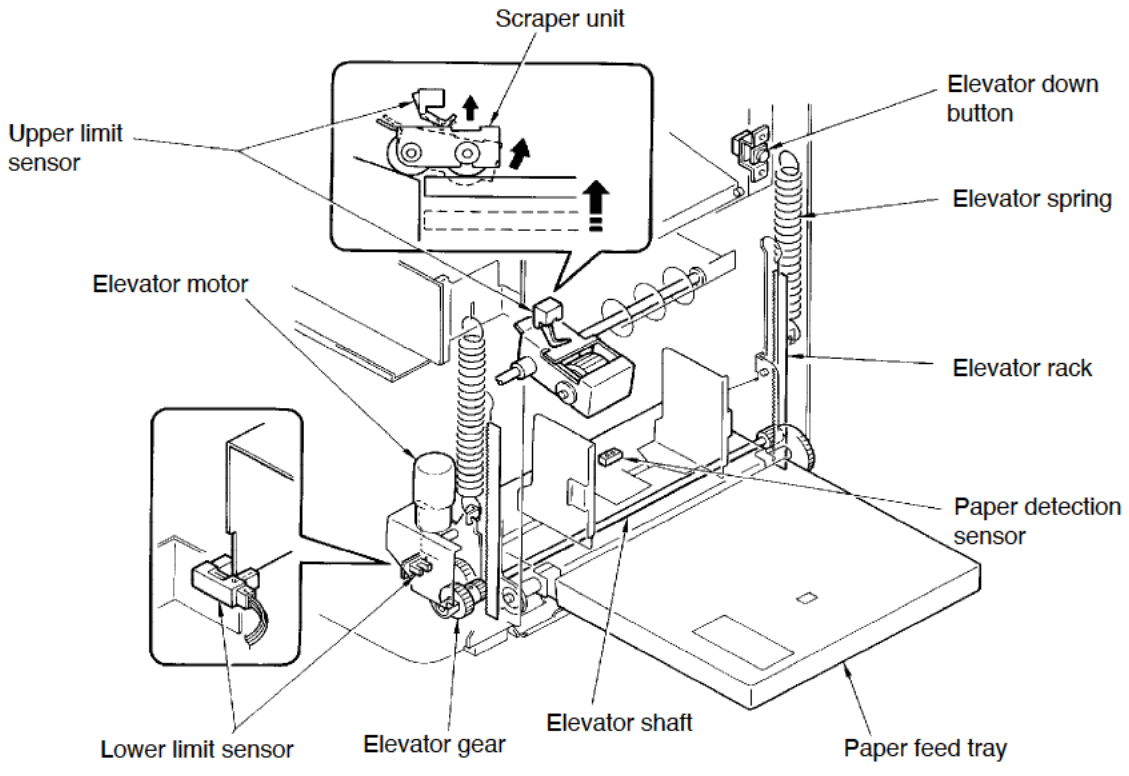
When the START button is pressed, the elevator motor lifts the Paper feed tray until the Upper limit sensor of the Tray is pressed.
When the Upper limit sensor is pressed, the Elevator motor turns in the reverse direction to lower the Tray down just a little bit and then rotates in the original direction again to raise the Tray until the Upper limit sensor is pressed for the second time.
Printing is then started by the Main motor, turning the Drum.

- Elevation during printing

During the printing as the height of the paper descreases (Upper limit sensor is released), the Elevator motor rotates to raises the tray until the Upper limit sensor is pressed again.
This operation is repeated to maintain the paper feed tray height, until the paper supply is depleted.

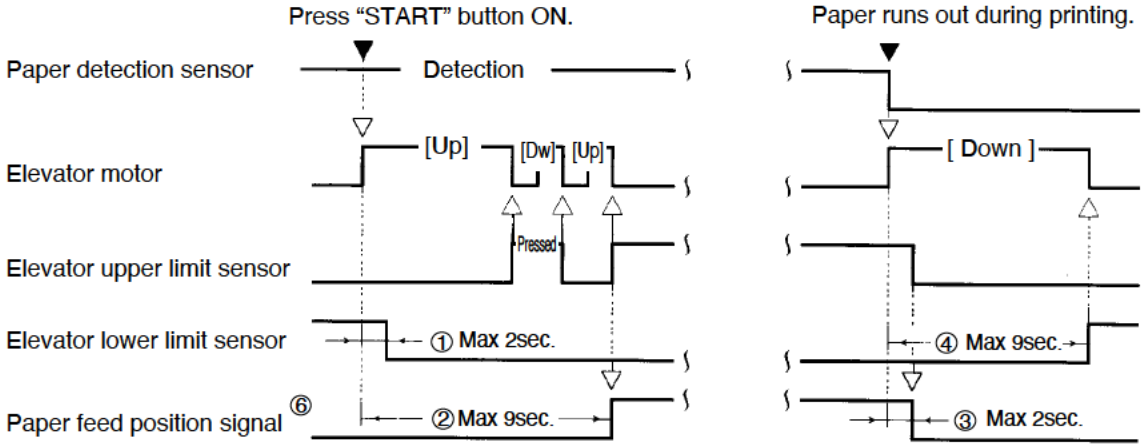
- Lowering of Feed Tray

The Paper detection sensor detects when the paper has run out, (the sensor's light does not reflect back).
The Elevator motor rotates to bring the Tray down, until the light path of the Lower limit sensor is cut.
If the Elevator down button is pressed while the machine is idle, the Elevator motor turns to lower the Tray until the button is released or the light path of the Lower limit sensor is cut.

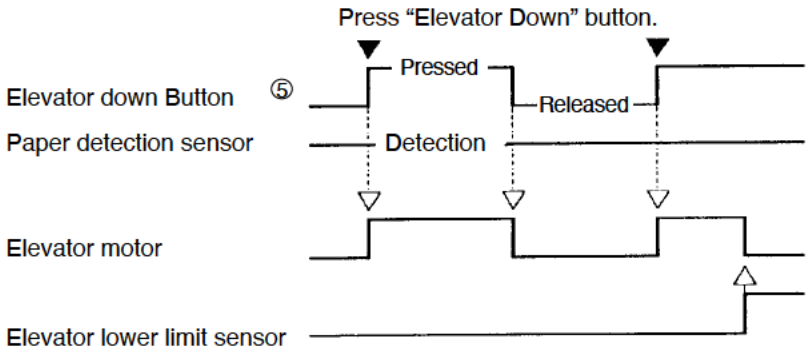


- Timing Chart -

Paper Feed Tray Elevation System



During Idling



① If the light path of the Elevator lower limit sensor has not been opened **within 2 seconds** after the Elevator motor starts to raise the Paper feed tray, the machine assumes the Elevator motor has been locked and displays the error code **[E 02]**.

② If the actuator of the Elevator upper limit sensor has not been pressed (to open the light path of the sensor) **within 9 seconds** after the Elevator motor starts to raise the Paper feed tray, the machine assumes the Elevator motor has been locked and displays the error code **[E 02]**.

③ If the actuator of the Elevator upper limit sensor has not been released (to cut the light path of the sensor) **within 2 seconds** after the Elevator motor starts to lower the Paper feed tray, the machine assumes the Elevator motor has been locked and displays the error code **[E 02]**.

④ If the light path of the Elevator lower limit sensor has not been cut **within 9 seconds** after the Elevator motor starts to lower the Paper feed tray, the machine assumes the Elevator motor has been locked and displays the error code **[E 02]**.

⑤ The Elevator down button cannot be activated while the machine is printing.

⑥ The Paper feed position signal is output from the Motor control PCB when the Paper feed tray is positioned at the height suitable to feed paper.

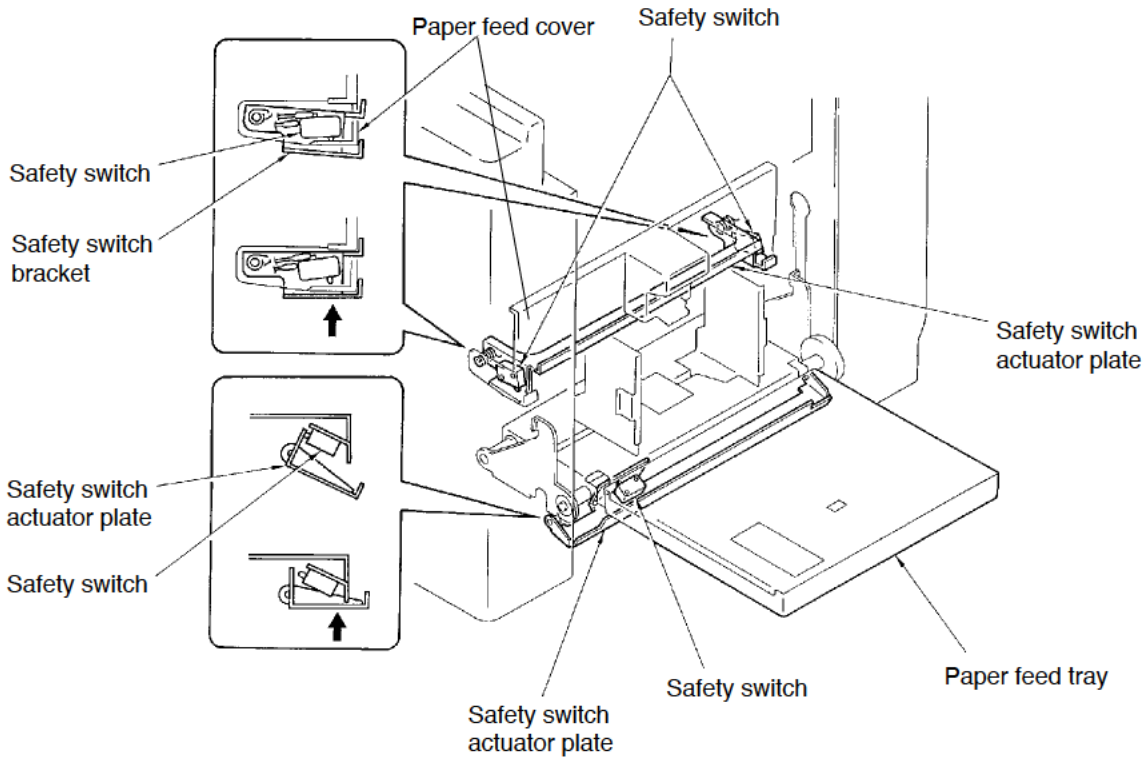
3. Paper Feed Tray Safety System

- Basic

The Paper feed tray is equipped with safety systems.

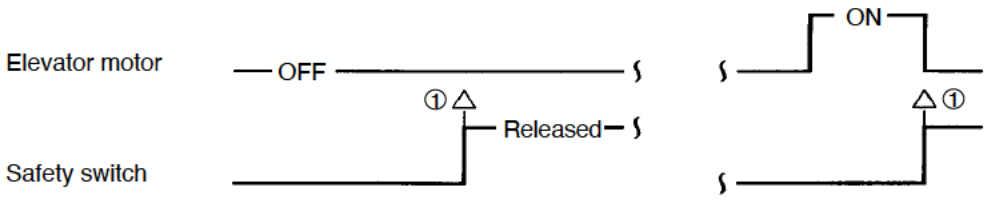
- Paper Feed Tray Safety System

The safety systems are located at the bottom of the Paper feed cover and under the Paper feed tray. (The safety system under the Paper feed tray is not installed in RA 4200.)
If the actuator plate is pressed in either of these safety systems, safety switches are released in the safety system whose actuator plate is pressed, by which the machine assumes that an obstacle has been stuck on or under the Paper feed tray and displays an error code **[E 60]** to interrupt the machine operation.



- Timing Chart -

Paper feed tray safety system



① When the Safety switch is released, the machine assumes that an obstacle has been stuck on or under the Paper feed tray and the Elevator motor makes an emergency stop, causing the error code **[E 60]** displayed.
In normal operating condition, the Safety switches are pressed.

4. Paper Width Detection System

- Basic

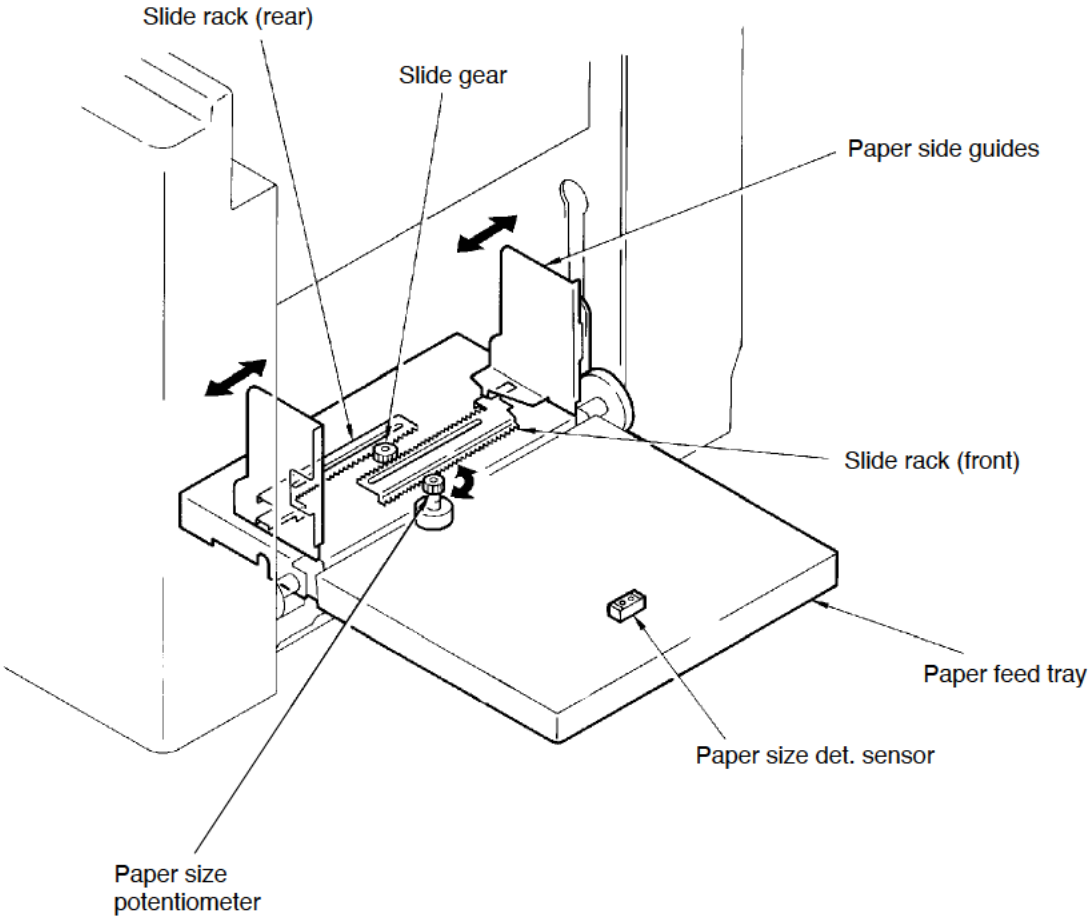
The Paper feed tray is equipped with the Paper size potentiometer and Paper size det. sensor, which check the size and set direction of paper loaded on the tray.
According to the detected paper size and direction, the Jump wings are automatically positioned in the Suction unit to secure better paper ejection and an image area is limited on a master not to go beyond printing paper size.

- Paper Width Detection

The movement of the Paper side guides are transmitted to the Paper size potentiometer via the Slide racks.
When the side guides are moved and set against the paper on the Paper feed tray, the potentiometer rotates and detects the paper width.

- Paper Direction Detection

The Paper size det. sensor checks whether paper is loaded on the paper feed tray, longways or sideways.
If the sensor detects paper (reflected light), it is assumed that paper is loaded longways.



5. First Paper Feed Rollers Rotary System

- Basic

The Scraper and Pickup rollers are driven by the Paper feed clutch.

- Paper Feed Clutch Sensor & P Disc

The Paper feed clutch is activated by the paper feed clutch sensor.
When the Main motor rotates, the P disc rotates clockwise through the Paper feed clutch sensor.
If the light path of the Paper feed clutch sensor is opened, the Paper feed clutch is engaged.
If the light path of the Paper feed clutch sensor is blocked, the Paper feed clutch is disengaged.

- Transmission of Rotation Power

The Paper feed clutch is driven by the Main belt.
When the Paper feed clutch is activated, clutch components are engaged by the electromagnet, transmitting the rotation of the Main belt to the Pickup roller via the Pickup roller shaft.
The Pickup and Scraper rollers drive paper to the second paper feed section.

- Prevention of Brake Effect by Pickup and Scraper Rollers

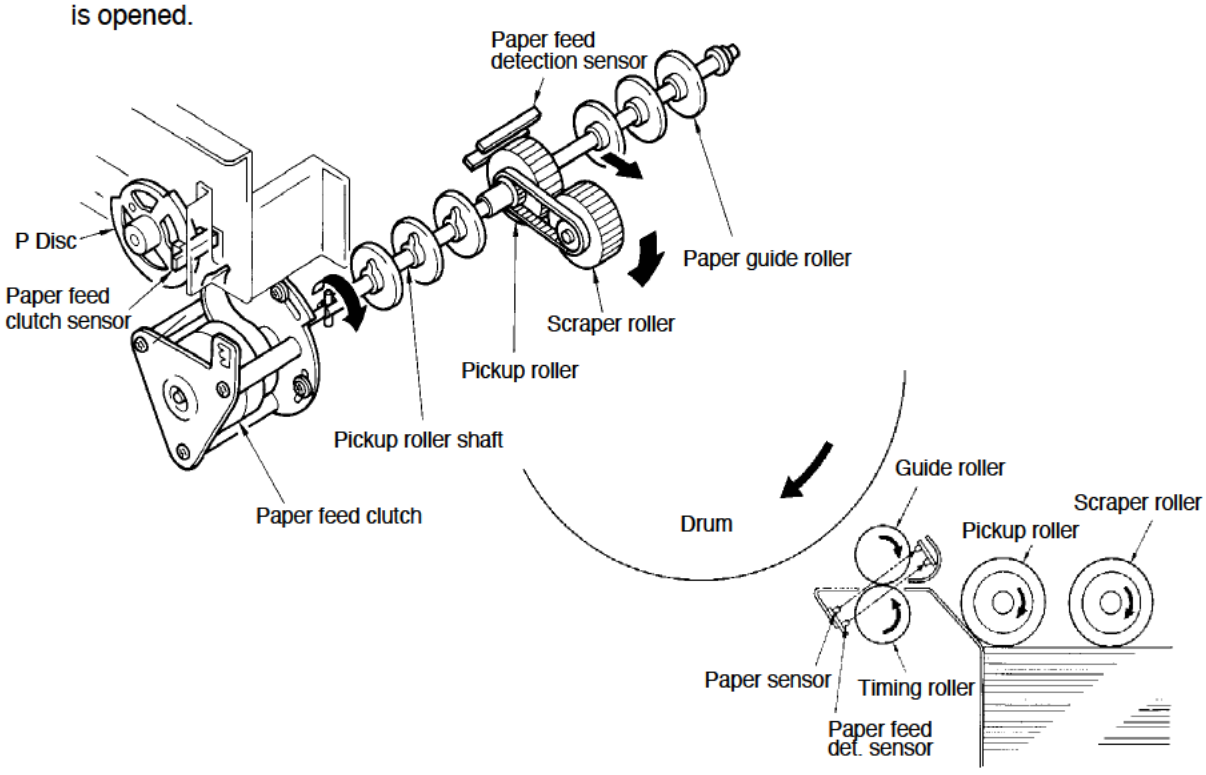
The Pickup and Scraper rollers have one-way bearings built-in.
The one-way bearings allow the paper to feed into the second paper feed section freely.

- Paper Feed Detection Sensor

To monitor the timing of paper transfer to the second paper feed section, a photo sensor, i.e. Paper feed detection sensor, is installed before the Guide roller.
When the paper feed detection sensor detects paper, the paper feed clutch is disengaged a preset period later and the first paper feed operation is completed. At this point, the leading edge of the paper contacts the Guide roller and Timing roller.
If the light path of the Paper feed clutch sensor is blocked by the P disc before the Paper feed detection sensor detects paper, the paper feed clutch is disengaged at once to end the first paper feed operation even though the Paper feed detection sensor has not detected paper.

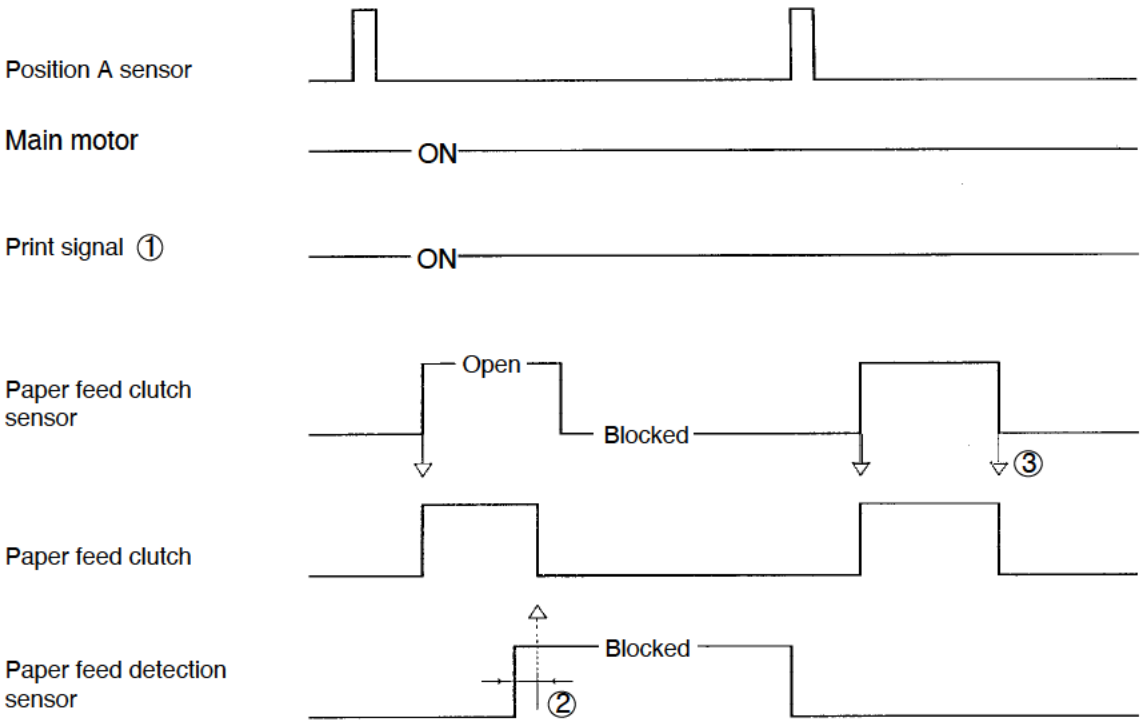
[Note]

The Paper feed detection sensor is ignored for the first test print, and also when the Paper feed pressure adjustment lever is set low for "CARD", i.e. thick paper.
In this case, the Paper feed clutch operates while the light path of the Paper feed clutch sensor is opened.



-Timing Chart -

First Paper Feed Rollers Rotary System (During Printing)



① The Print signal starts the paper feed operation. If the light path of the Paper feed clutch sensor is opened while the Print signal is ON , the Paper feed clutch is engaged.

② After the Paper feed detection sensor detects the leading edge of a sheet, the Paper feed clutch is disengaged.

③ When the light path of the Paper feed clutch sensor is blocked, the Paper feed clutch is disengaged.

- **The conditions for the Paper feed clutch's engagement**
  (All of the following three conditions are requisite.)
  1. The Print signal is output (ON).
  2. The light path of the Paper feed clutch sensor is opened.
  3. The Stack paper feed sw is not actuated ON.

- **The conditions for the Paper feed clutch's disengagement**
  (Any one of the following four conditions is enough.)
  1. The Print signal is not output (OFF).
  2. The Paper feed detection sensor detects the leading edge of a sheet.
  3. The light path of the Paper feed clutch sensor is blocked.
  4. The Stack paper feed sw is actuated ON.

6. Paper Feed Pressure Select System

- Basic

Paper feed pressure is changed by the Paper feed pressure adjustment lever.

- Paper Feed Pressure Adjustment Lever

The Paper feed pressure adjustment lever is located above the Scraper unit and positioned at two levels, high ("NORMAL") and low ("CARD"), securely with the help of the Lever spring attached to the left side of the lever.

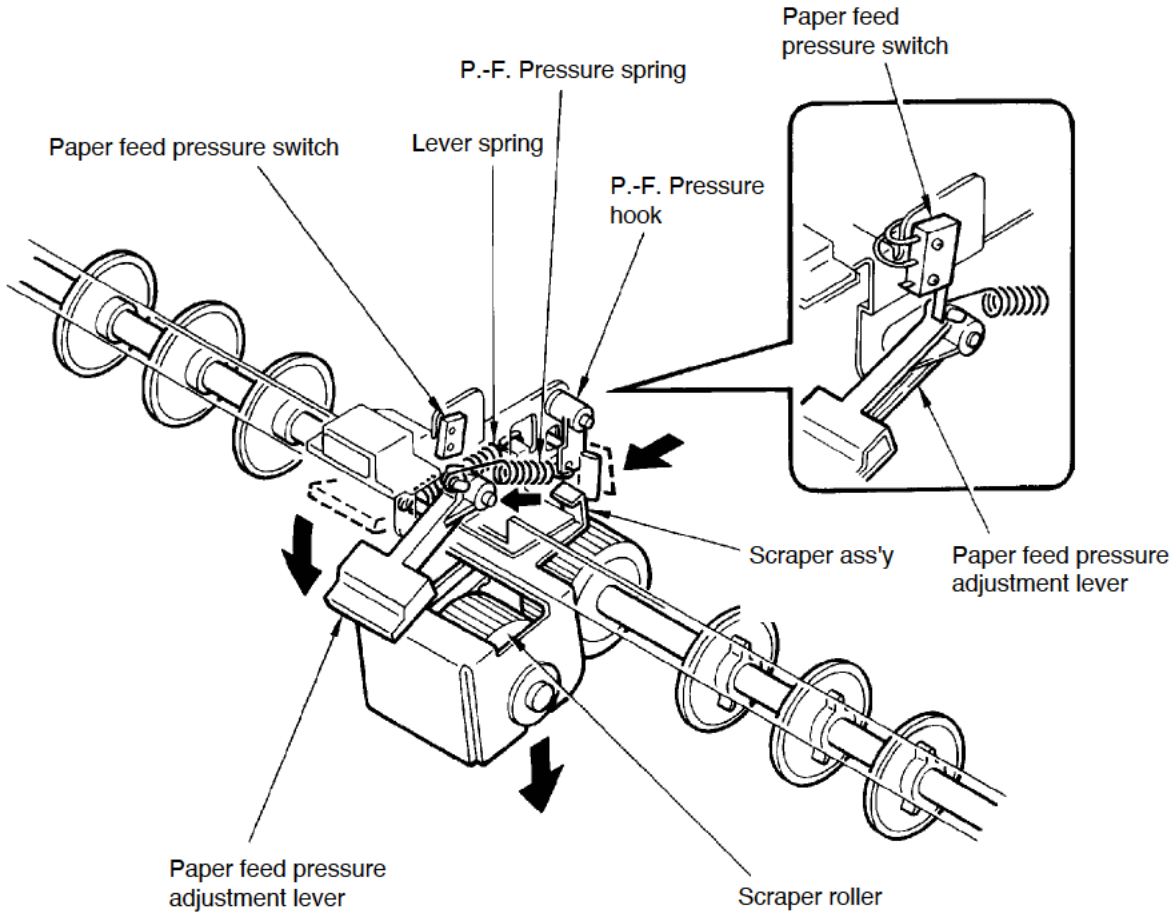
- Pressure Selection

The P.-F. Pressure spring is hooked to the Paper feed pressure adjustment lever at one end and to the P.-F. Pressure hook at the other end.

The lever, when set low for "CARD", pulls the hook via the spring. The pulled hook pushes down the Scraper ass'y against the loaded paper, giving more feeding pressure than by the assembly's weight. When the lever is set high for "NORMAL", the feeding pressure is less because no pressure is given other than the weight of the Scraper ass'y with the relaxed spring.

- Paper Feed Pressure Switch

When the lever is set low for "CARD", it presses the actuator against the Paper feed pressure switch, which prevents the Paper feed detection sensor from operating during printing.



7. Paper Pickup System

- Feeding

Some sheets of paper on the Paper feed tray is fed by the Scraper roller into between the Pickup roller and Stripper plate.

- Pick-up

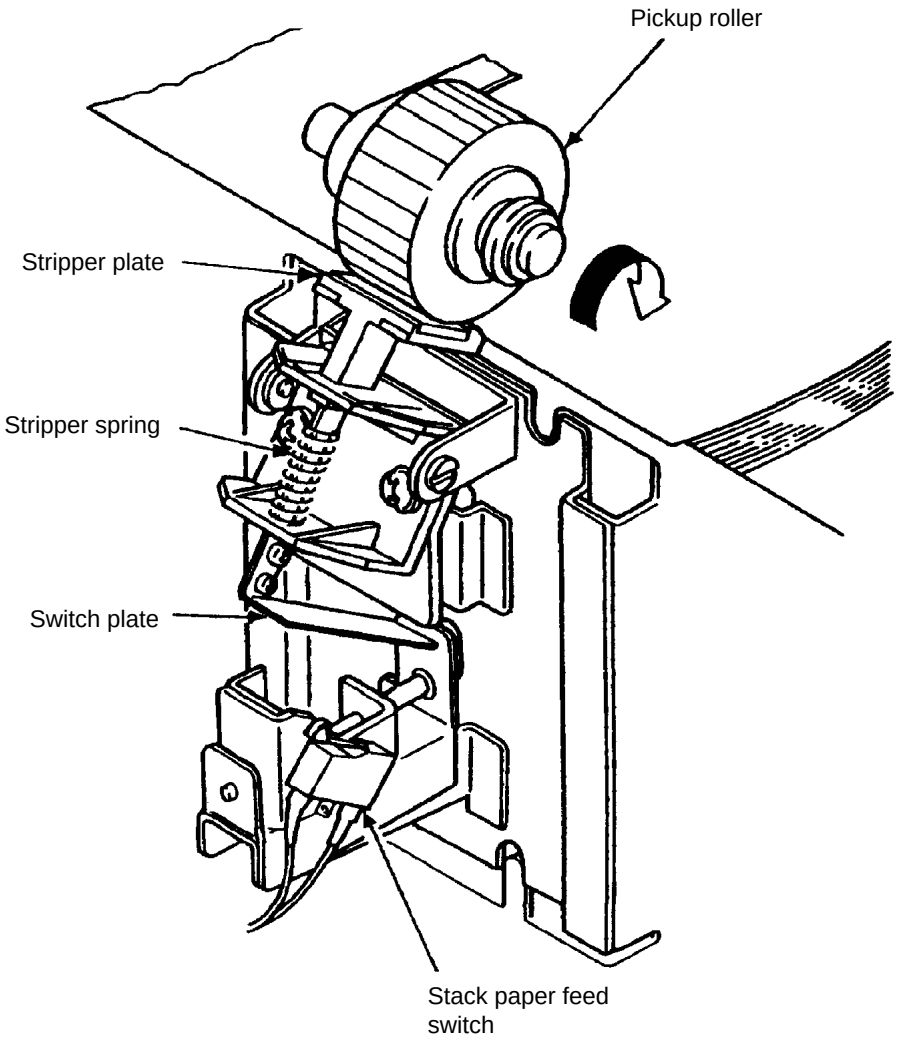
The top sheet is separated from the rest by the Pickup roller and Stripper plate.

THe Stripper plate is pressed against the Pickup roller by the Stripper spring to provide resistance against paper feed, by which only a single sheet of paper is fed from the paper stack.

- Detection of Stack Paper Feed

If multiple sheets of paper are fed, the Stripper plate is pushed down, causing the switch plate to contact the actuator of the Stack paper feed switch.

When the Stack paper feed switch is pressed, the Paper feed clutch is disengaged to stop feeding paper.



8. Second Paper Feed System

- Shift-up of Timing Roller

The Timing cam attached to the Cam pulley rotates clockwise when the Main motor rotates.
As the Timing cam rotates, the Timing cam follower on the Timing lever, pressed against the cam by the Timing spring, follows the cam and is shifted up and down on the cam.
When it follows the cam from the high point to the low one in the cam's rotation while a sheet is picked up and fed in the first paper feed area, the Timing lever is driven to rotate the Timing roller shaft clockwise, raising the Timing roller mounted on the holder to the Guide roller.
The raised Timing roller is kept in contact with the Guide roller with sufficient pressure by the Timing lever spring.

- Rotation of Guide Roller

In the same way as of the Timing cam follower, the Guide cam follower is shifted up and down on the Guide roller cam when the Main motor rotates.
When it follows the cam from the low point to the high one in the cam's rotation after a feeding sheet reach the Guide roller, the Sector gear is driven to rotate the Guide roller gear clockwise.
The Guide roller gear incorporates a one-way spring clutch to rotate the Guide roller only when the Guide roller gear is driven clockwise and not to transmit rotation to the Guide roller when the Guide roller gear rotates counter-clockwise.

- Rotation of Timing Roller

When the Timing roller is raised, the Gear B on the Timing roller shaft is engaged with the Gear A on the Guide roller shaft.
When the Guide roller is rotated, the Timing roller is simultaneously rotated via the Gears A and B to feed a sheet to the print area.

- Shift-down of Timing Roller

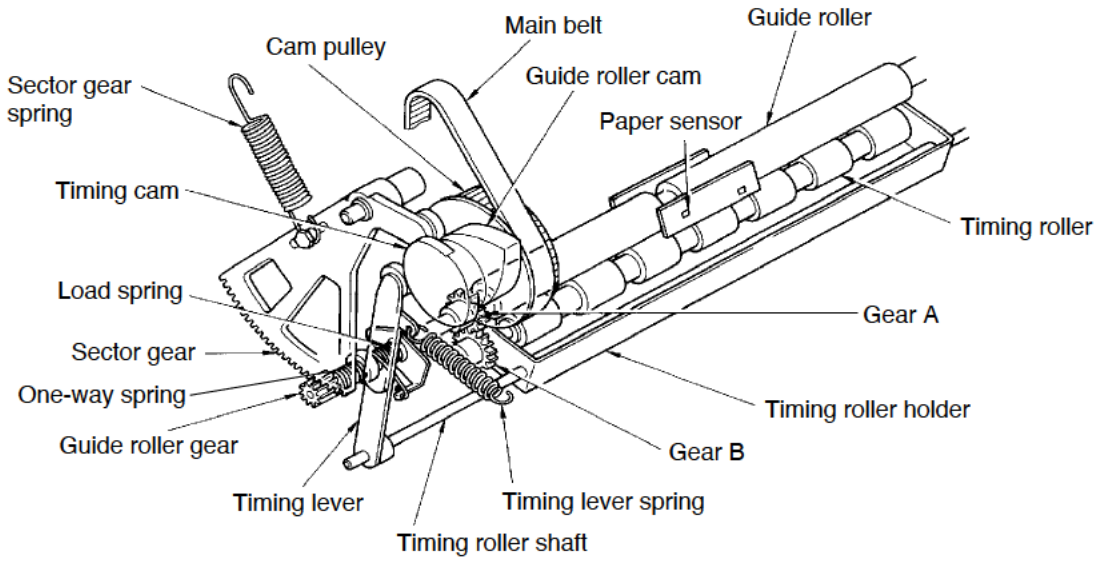
When the Guide and Timing rollers finish rotating and the Timing cam follower follows the cam from the low point to the high one, the Timing lever is driven to rotate the Timing roller shaft counter-clockwise, lowering the Timing roller.

- Check of Paper Feed

The Paper sensor checks if a sheet is securely fed through the Guide and Timing rollers up to the print area.

- Function of Load Spring

The Load spring is put on the Guide roller shaft to prevent the roller from rotating when the rotation force is not transmitted to the roller by applying a load against rotation, which serves constant print position (registration).

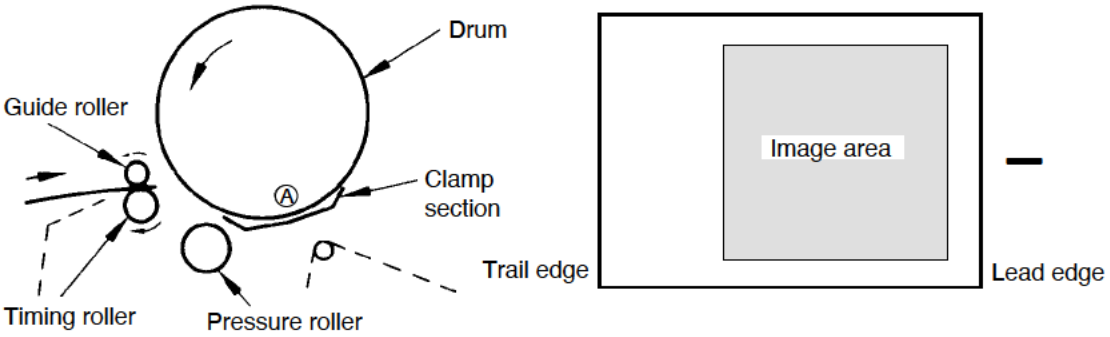


9. Vertical Position Control System

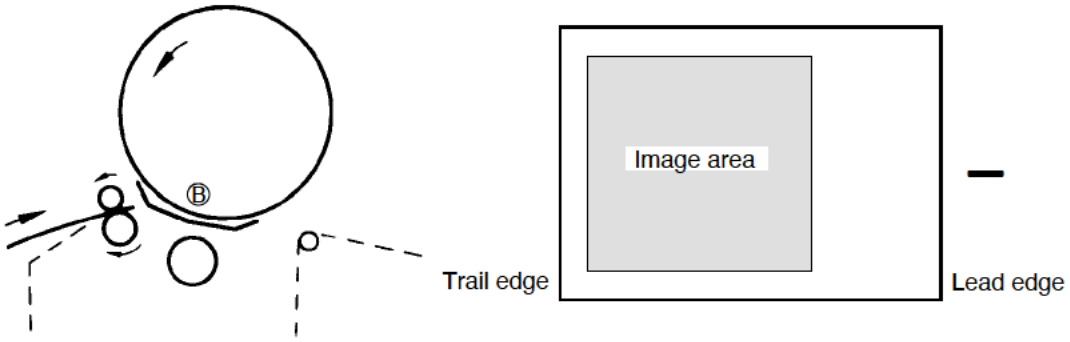
- Basic

When pressing the print position button on the operation panel, the Print positioning motor rotates and changes the vertical print position in steps on the printed copy to a maximum of ±**20mm**.

<1> Suppose the Guide roller starts rotating and feeding a sheet to the print area when the Clamp section on the Drum is rotated to point A in the figure.
In this case, the image area on printed copies is as shown in the figure below.



<2> Next suppose the Guide roller starts rotating and feeding a sheet to the print area when the Clamp section on the Drum is rotated to point B in the figure.
In this case, the sheet is fed earlier and the image area goes down to the bottom of printed copies as shown in the figure below.



The print position in the vertical direction is determined by the start time of the rotation of the Guide roller.

9. Vertical Position Control System

- Rotation of Print Positioning Motor
When the Print position button "DOWN" on the operation panel is pressed to shift down the image area on printed copies, the Print positioning motor rotates clockwise, causing the Slide shaft to rotate counter-clockwise via the Slide gear.

- Elevation of Slide Plate
By the rotation of the Slide shaft, the Slide shaft bracket, which is fixed to the Slide plate, is elevated to shift up the Slide plate.

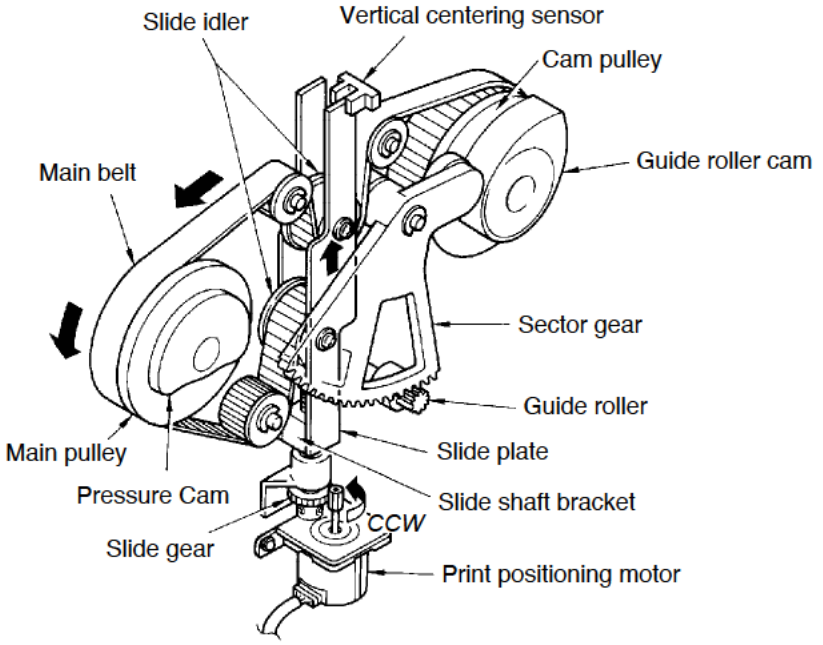
- Movement of Main Belt
When the Slide plate is shifted up, the two Slide idlers, which are fixed to the Slide plate to provide tension on the Main belt, are also elevated. This loosens the tension of the Main belt on the upper idler and tightens it on the lower idler, causing the Main belt to move counter-clockwise.

- Rotation of Main Pulley
When the Main belt moves counter-clockwise, the Main pulley is rotated counter-clockwise and the Drum is as well rotated out of the home position.
With the cams and pulleys arranged as above, the Sector gear is started to move earlier, causing the Guide roller as well to start rotating earlier to feed paper to the print area earlier.
As a result, the image area is shifted to the bottom on printed copies.

- Shift-up of Image Area
When the Print position button "UP" is pressed, the Print positioning motor rotates counter-clockwise, causing the Guide roller to start rotating later to shift the image area to the top on printed copies (by moving the belt and pulley in the direction opposite to the above case).

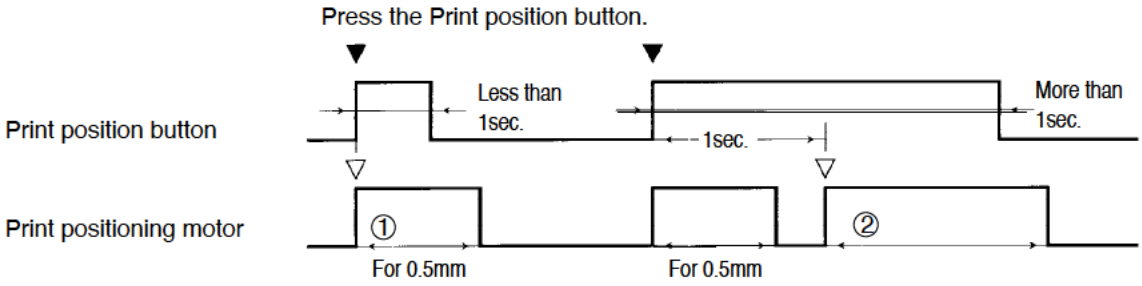
- Automatic Print Position Centering
The print position is automatically returned to the center (only vertically) by the Print positioning motor in the following cases: **1)** when the power switch is turned ON, **2)** when the "Centering" button is pressed, and **3)** when the "RESET" button is pressed.
<Mechanism>

1. If the light path of the Vertical centering sensor is blocked by the Slide plate, the Print positioning motor is rotated until the light path is opened.
2. If the light path of the Vertical centering sensor is open, the Print positioning motor is rotated until the light path is blocked by the Slide plate, and then the motor is rotated in reverse until the light path is opened again.



- Timing Chart -

Vertical Position Control System

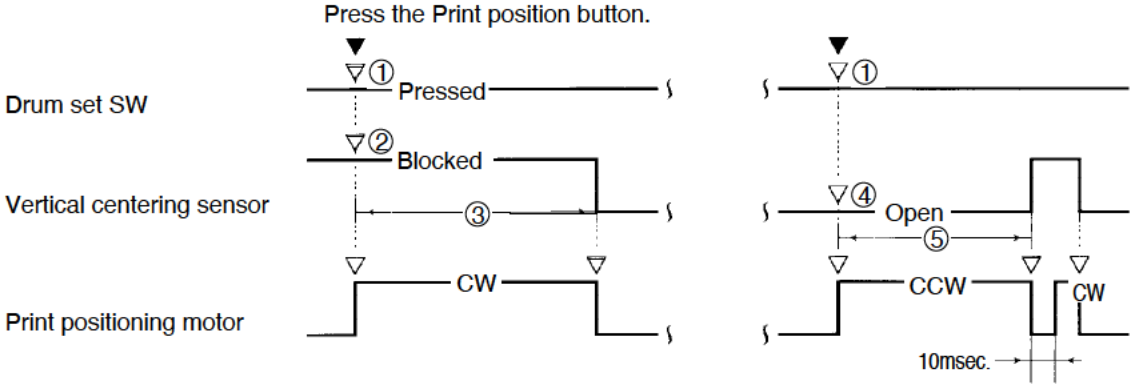


① If the Print position button is pressed, the Print positioning motor is kept rotating until the print position is shifted by 0.5mm.

② If the Print position button has been pressed for more than 1 sec., the Print positioning motor restarts and keeps rotating (within the range of ±20mm from the center) while the button is kept pressing.

* The LED "WAIT" blinks on the operation panel while the Print positioning motor is operating.

Automatic Print Position Centering Mechanism



① If the Drum set SW is not pressed ON, the Print positioning motor doesn't rotate for the automatic print position centering operation.

② If the light path of the Vertical centering sensor is blocked, the Print positioning motor rotates to lower the Slide plate.

③ If the light path of the Vertical centering sensor has not been opened within **12 seconds** after the Print positioning motor started operating, the machine assumes a Print positioning motor lock has occurred and displays the error code **[E 05]**.

④ If the light path of the Vertical centering sensor is open, the Print positioning motor rotates to raise the Slide plate.

⑤ If the light path of the Vertical centering sensor has not been blocked within **12 seconds** after the Print positioning motor started operating, the machine assumes a Print positioning motor lock has occurred and displays the error code **[E 05]**.

* The LED "WAIT" blinks on the operation panel to prevent any key entry while the Print positioning motor is rotating for the automatic print position centering operation.

10. Paper Pickup System <GR>

- Feeding

Some sheets of paper on the Paper feed tray is fed by the Scraper roller into between the Pickup roller and Stripper sheet.

- Pick-up

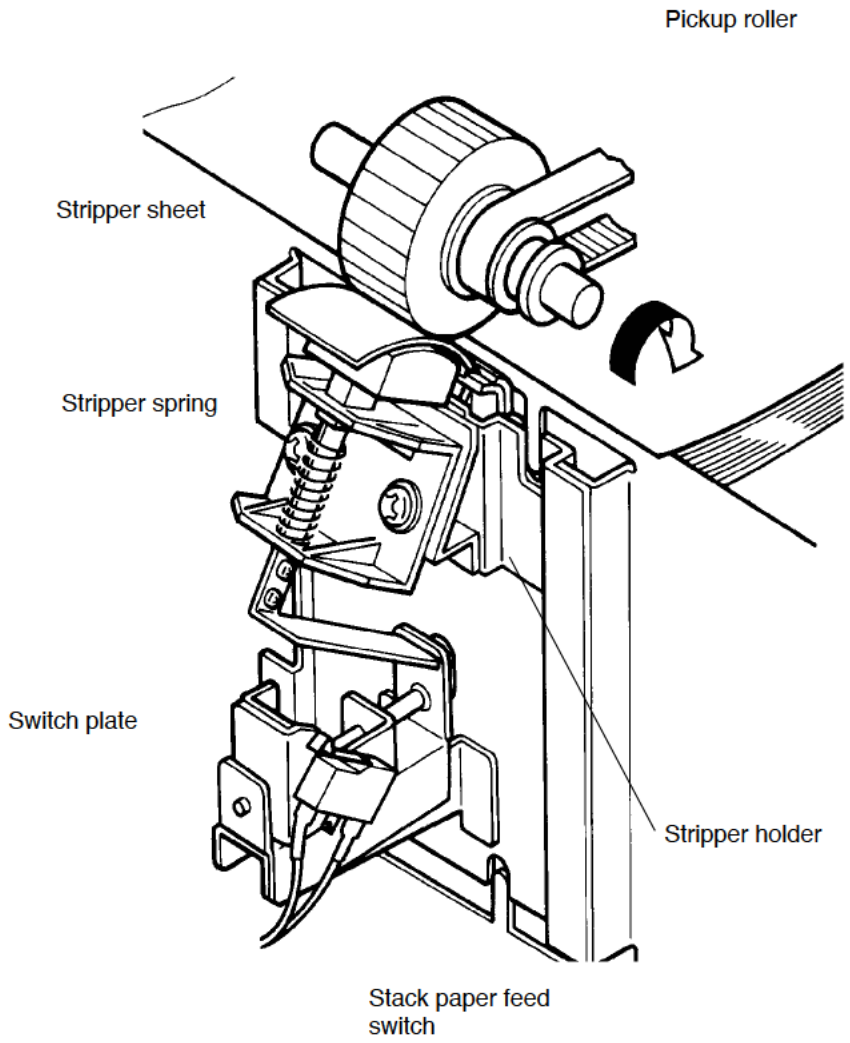
The top sheet is separated from the rest by the Pickup roller and Stripper sheet.
The Stripper sheet is supported from underneath by the Stripper holder and pressed against the Pickup roller by the Stripper spring to provide resistance against paper feed, by which only a single sheet of paper is fed from the paper stack.

- Constant Pick-up Pressure

The Stripper holder is designed to seesaw according to the position of the Pickup roller. This design always keeps the Stripper sheet vertically pressed against the Pickup roller, thus realizing correct pickup pressure constantly.

- Detection of Stack Paper Feed

If multiple sheets of paper are fed, the Stripper plate is pushed down, causing the switch plate to contact the actuator of the Stack paper feed switch.
When the Stack paper feed switch is pressed, the Paper feed clutch is disengaged to stop feeding paper.



1. Paper Feed Section

[Removal and Assembly]

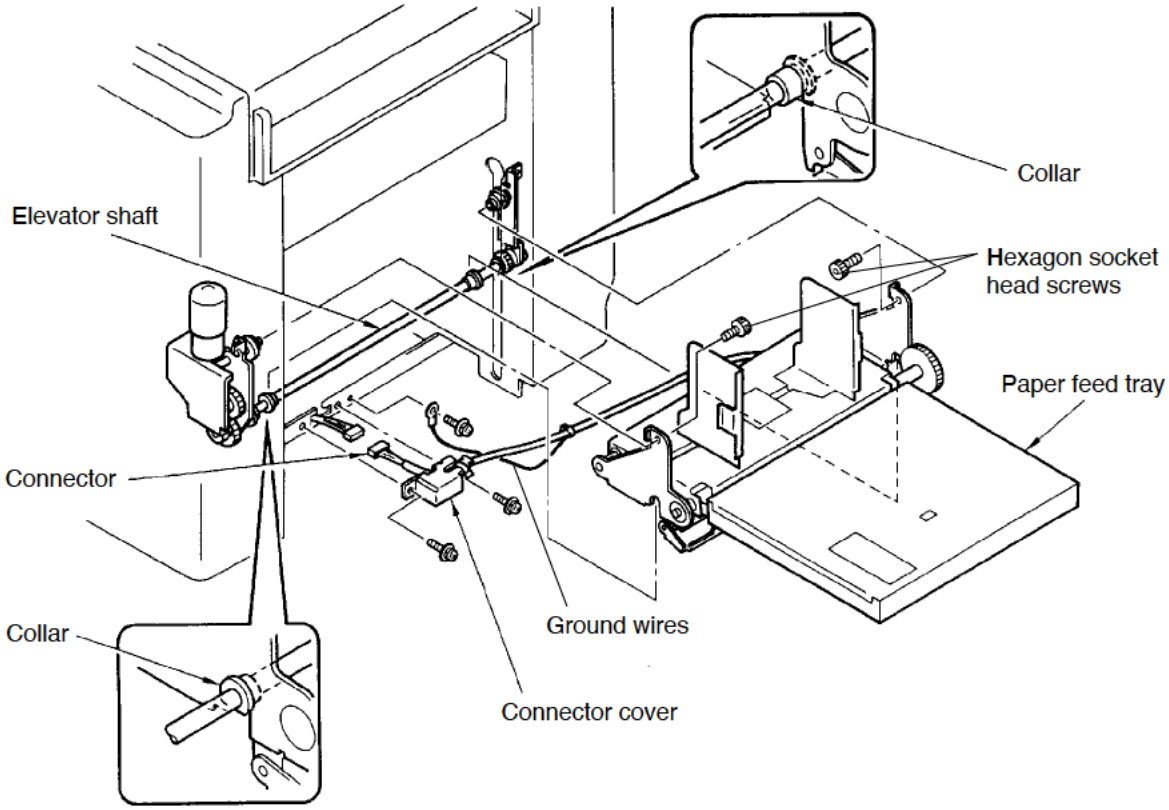
1. Paper Feed Tray Unit

< Removal Procedure >

1. Select Test mode **No. 102**.
   Press the Paper feed tray down button to raise the tray about a third way up.
   Turn OFF the power.
   [IMPORTANT]
   Do not raise the tray too high (more than a third way up) when removing the Paper guide plate after the tray.
2. Remove the screw securing the ground wire on the frame under the Stripper unit.
3. Remove two screws holding the Connector cover located under the Stripper unit.
4. Pull out the wire harness until the connector comes out from under the Stripper unit.
   Disconnect the connector.
   [IMPORTANT]
   Cut a clamper holding the wire harness in the Drive base unit to allow the wire harness to be pull out smoothly.
5. Remove two hexagon socket head screws and dismount the Paper feed tray unit.

- Precautions In Assembly -

- Make sure to mount the Paper feed tray firmly on collars on both sides.
- Pull out the slack wire harness toward the Drive base unit after assembly to prevent it from being caught by the Drum rail.
- If the connector of the wire harness is disconnected, the machine assumes the Paper feed tray safety sw (bottom) is not actuated ON and prevents the Elevator motor from operating.



2. Paper Detection Sensor

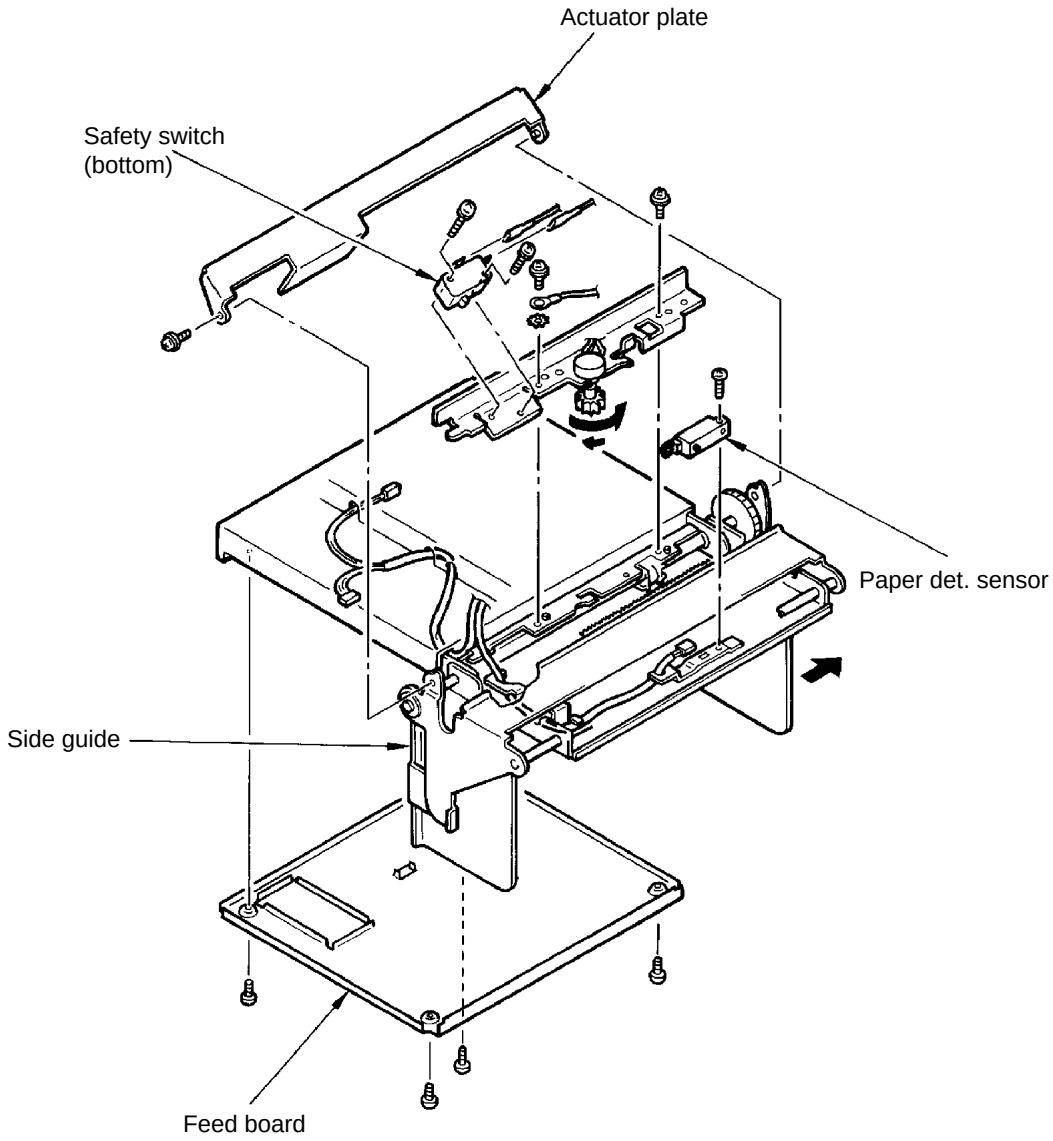
< Removal Procedure >

1. Remove the Paper feed tray unit, referring to the procedures described in page I-15.
2. Turn the tray upside down, remove the mounting screw on the Paper detection sensor, and remove the sensor by disconnecting the connector.

3. Paper Feed Tray Safety SW (Bottom) - Not for RA4200

< Removal Procedure >

1. Remove the Paper feed tray unit, referring to the procedures described in page I-15.
2. Turn the tray upside down, remove the mounting screw on the Actuator plate, and remove the plate.
3. Remove two mounting screws on the Paper feed tray safety SW (bottom), and remove the switch by disconnecting the wires.



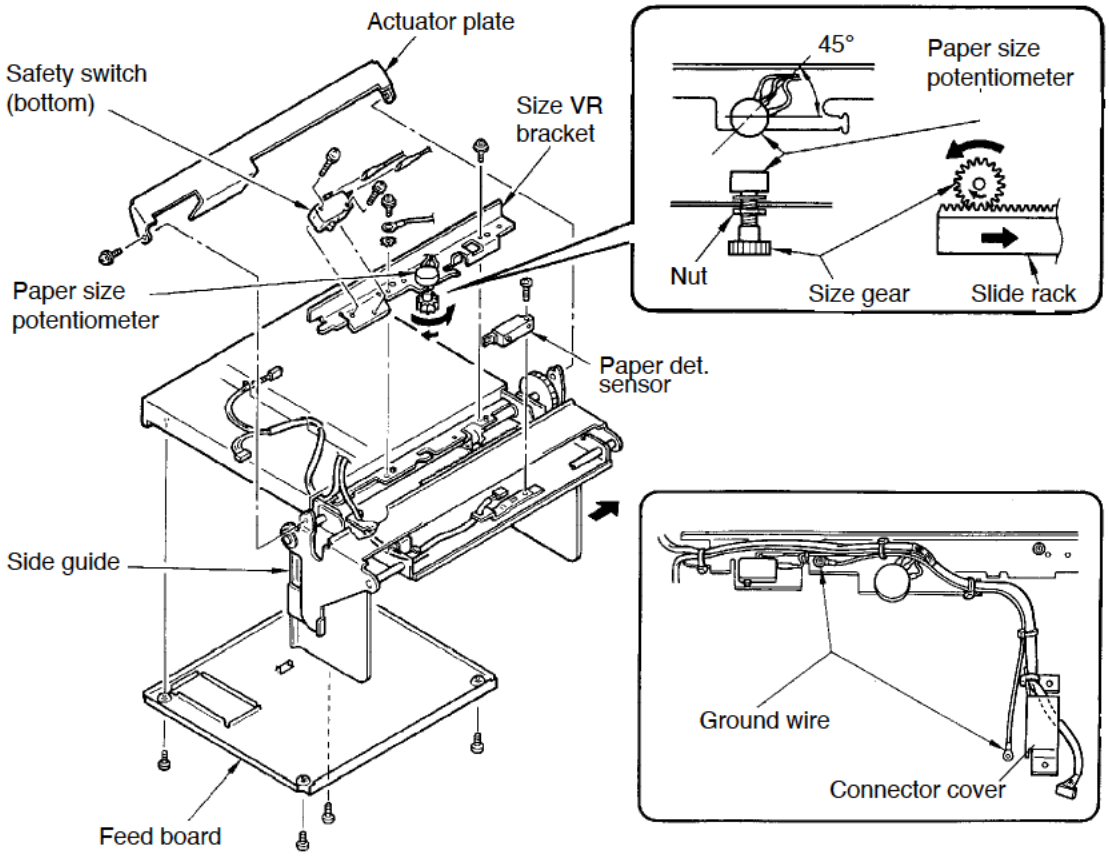
4. Paper Size Potentiometer

< Removal Procedure >

1. Remove the Paper feed tray unit, referring to the procedures described in page I-15.
2. Turn the tray upside down and remove the Actuator plate.
3. Remove two mounting screws on the Size VR bracket, and remove the bracket.
   A Ground wire and a washer will be removed at the same time.
4. Remove four screws on the Feed board and remove the board.
   Disconnect the wire harness connector of the Paper size sensor.
5. Loosen the nut on the Paper size potentiometer, and remove the potentiometer together with the Wire harness assembly attached.
   The potentiometer is replaced together with the Wire harness assembly.

- Precautions In Assembly -

- Attach the Paper size potentiometer onto the Size VR bracket with its wire harness terminal at an angle of 45° to the right, as shown below.
- When mounting the Size VR bracket back on the Paper feed tray unit, open wide the Side guides all the way and besides turn the Size gear in the counterclockwise direction all the way.
  Then return the Size gear one tooth back in the clockwise direction, and engage the Size gear with Slide racks.
  Make sure to secure the ground wire and washer onto the Size VR bracket with the mounting screw.
- Lead the wire harness of the Paper size potentiometer in the manner as shown below.
- Always check the accuracy of paper size detection after assembly. (Refer to the page VII-18.)



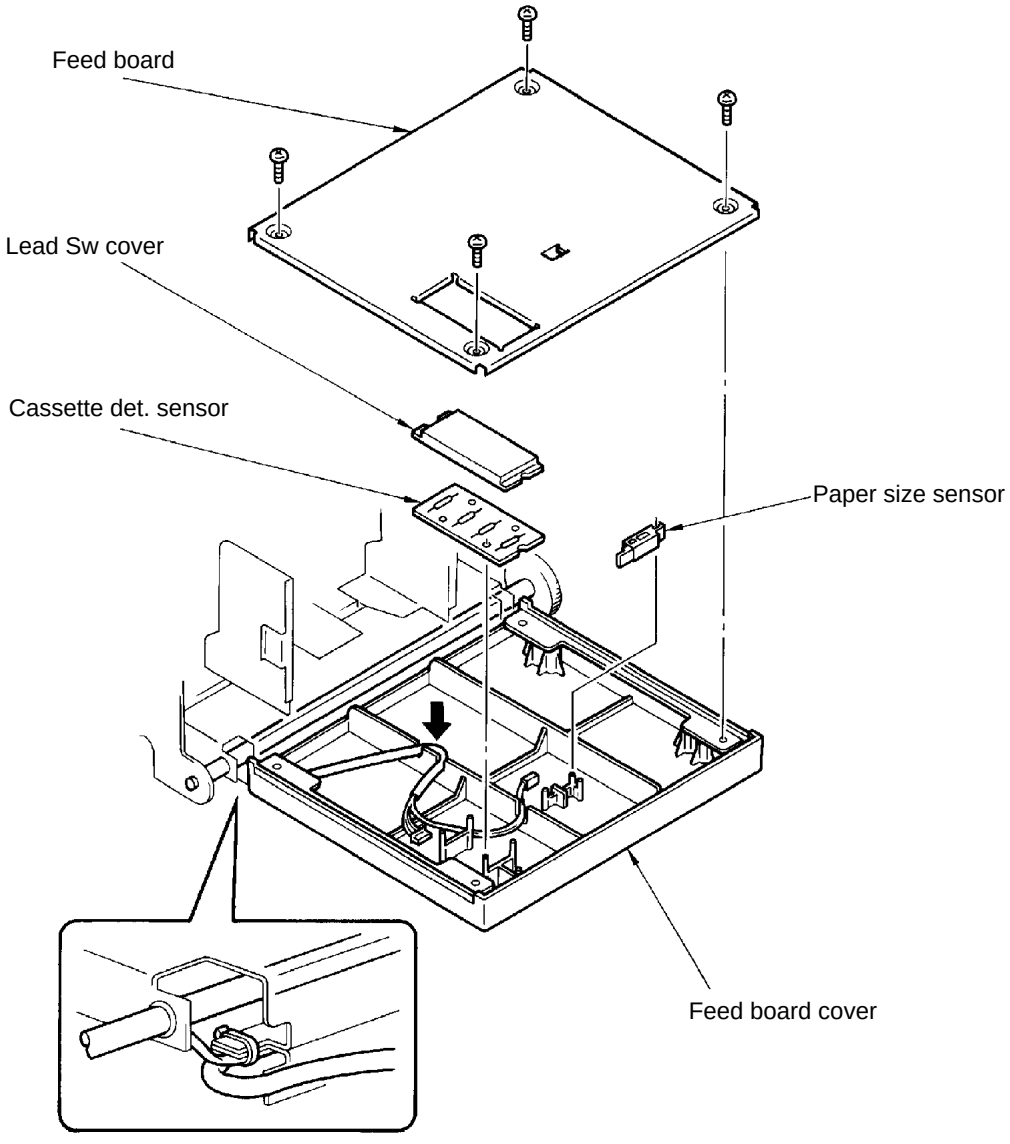
5. Paper Size Sensor

< Removal Procedure >

1. Remove four screws on the Feed board and remove the board.
2. Disconnect the wire harness cnnector of the Paper size sensor and remove the sensor from the holder.

- Precautions in Assembly -

- Do not place the sensor in a wrong direction.
- Lead the wire harness in the manner as shown below.



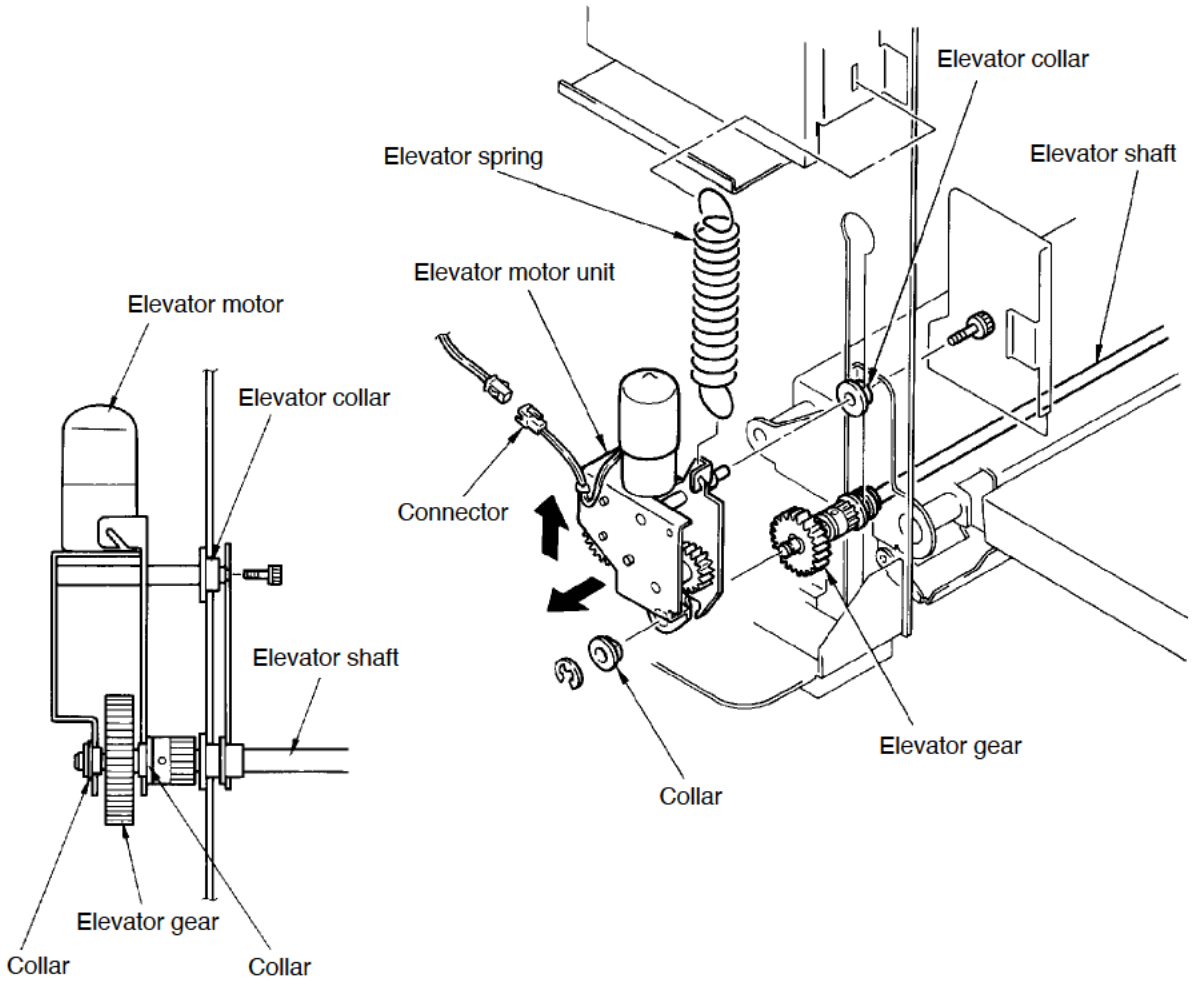
6. Elevator Motor Unit

< Removal Procedure >

1. Raise the Paper feed tray a little (by approx. 5mm) if it is positioned at the bottom, using Test mode **No.102**.
   [Note]
   In case the Elevator motor doesn't operate, raise the tray by manually rotating the worm gear of the Elevator motor.
2. Remove the Carrying grasp (a white plastic box) from the Bottom plate (left) by removing a tapping screw.
3. Remove the Elevator spring and the hexagon socket head screw securing the Paper feed tray unit on the Drive base side.
4. Disconnect the connector of the Elevator motor.
5. Remove the E-ring securing the collar at the end of the Elevator shaft and remove the collar.
6. Pull the Elevator motor unit toward you and lift it up off the Elevator shaft.

- Precautions In Assembly -

- Always put white grease on plastic gears in the Elevator motor unit and the Elevator gear after assembly.
- Position the Elevator shaft a little up before starting assembly.
- Put the Elevator collar on the upper shaft of the Elevator motor unit.



7. Stripper Unit

< Removal Procedure >

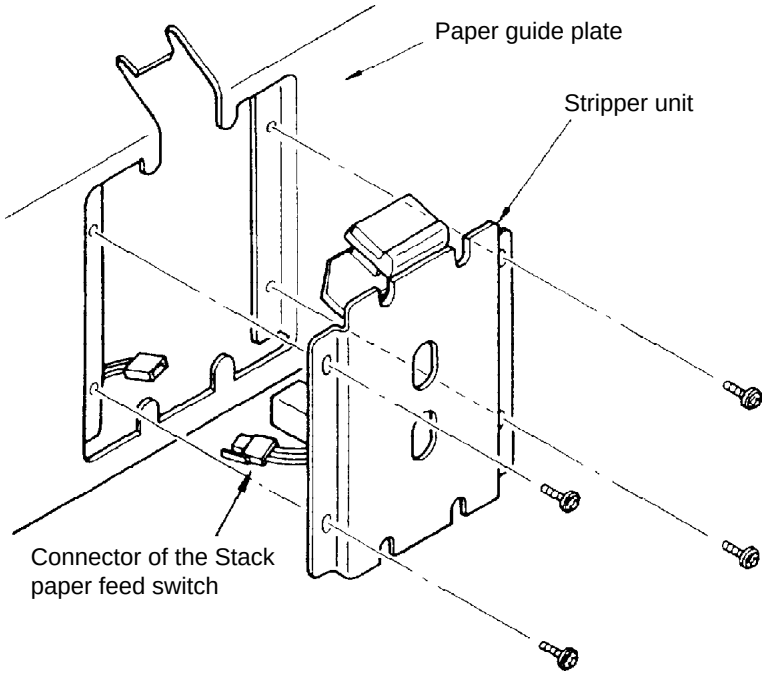
1. Bring the Paper feed tray all the way down, and turn OFF the power.
2. Remove four mounting screws securing the Stripper unit on the Paper guide plate.
3. Gently pull the Stripper unit away from the Paper guide plate and disconnect the connector of the Stack paper feed switch.
   [Note]
   Cut the wire clamper holding the wire harness of the Stack paper feed sw behind the Paper guide plate to allow the connector to be easily disconnected.

- Precaution in Removal -

- Be careful not to cut your fingers by burred edges of the Paper guide plate.

- Precautions in Assembly -

- Always hold the wire harness of the Stack paper feed sw with a wire clamper behind the Paper guide plate to prevent the Drum rail from catching the wire harness
- Do not forget to connect the Stack paper feed switch.
- Confirm that the Stripper unit is not installed slantwise. Otherwise, paper may feed slantwise.
- The Stripper pressure will differ depending on the mounting position of the unit.
  The Stripper plate pressure adjustment and Stack paper switch position adjustment must be made each time the Stripper unit is replaced.



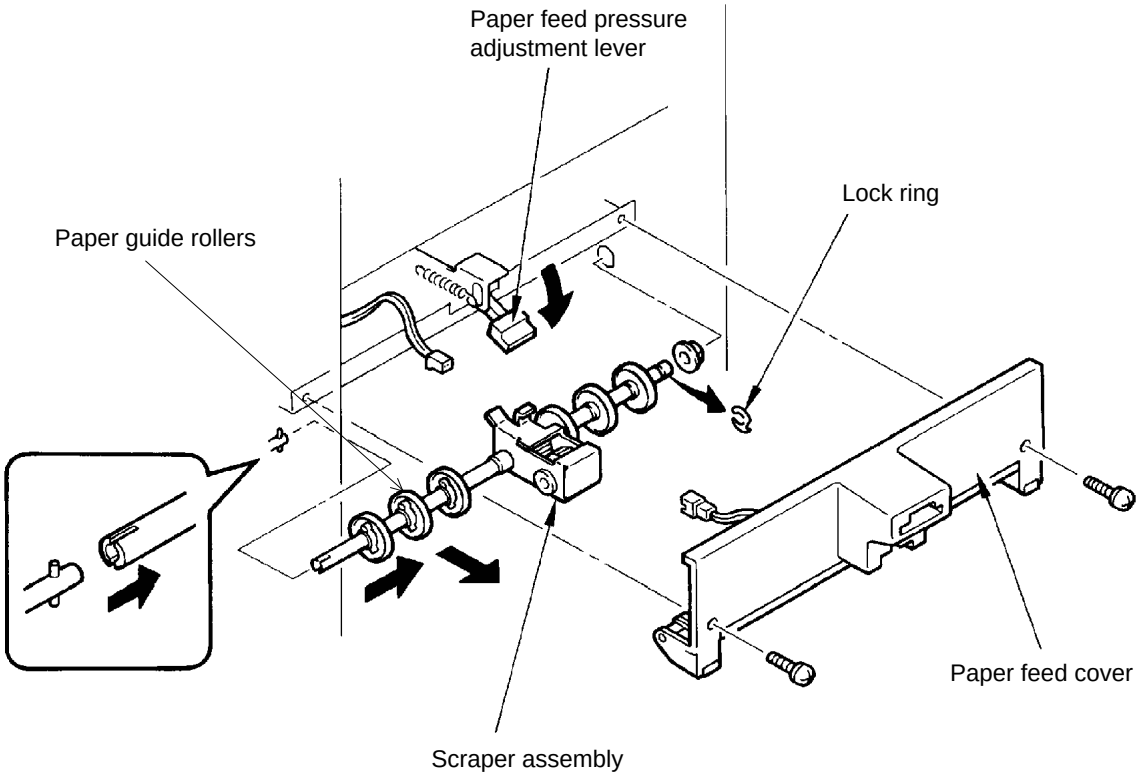
8. Scraper Unit

< Removal Procedure >

1. Lower the Paper feed pressure adjustment lever and remove two mounting screws on the Paper feed cover.
   Disconnect a wire harness connector and remove the cover.
2. Remove the Lock ring from the right end of the Pickup roller shaft.
   Slide the unit to the right and unhook the left end of the shaft from the Paper feed clutch shaft.
   [IMPORTANT]
   Be careful not to damage the actuator of the Elevator upper limit sensor.
3. Remove the unit from the machine by bringing out the left end of the shaft first.
   [Note]
   If the paper guide rollers hit against the Upper limit sensor bracket during the removal, slide the Paper guide rollers.

- Precaution in Removal -
- Be careful not to drop and lose the collar when removing the Scraper unit.

- Precautions in Assembly -
- Be careful not to damage the actuator of the Elevator upper limit sensor.
- After installing the unit in the machine, position the Paper guide rollers at equal distances on the shaft.



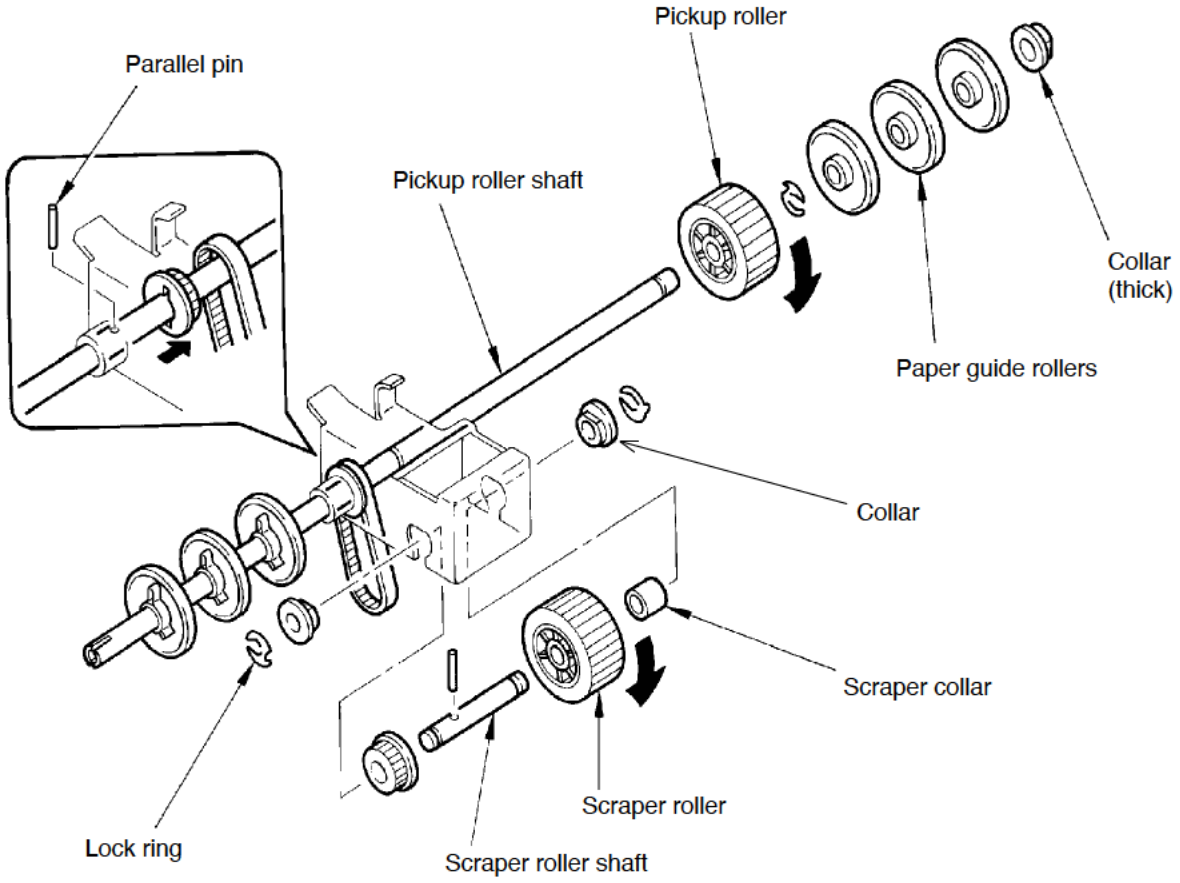
9. Scraper and Pickup Rollers

< Removal Procedure >

1. Remove two Lock rings and collars from the ends of the Scraper roller shaft.
2. Remove the Scraper roller from the shaft.
   [IMPORTANT]
   Be careful not to lose a parallel pin which is inserted into the Scraper roller shaft.
3. Slide out three Paper guide rollers on the right half of the Pickup roller shaft.
4. Remove the Lock ring on the right side of the Pickup roller and remove the roller from the shaft.
   [IMPORTANT]
   Be careful not to lose a parallel pin which is inserted into the Pickup roller shaft.

- Precautions In Assembly -

- As one-way bearings are built into the Scraper and Pickup rollers, be careful of the rotational direction upon installation.
  If the rollers are installed on the shafts in the wrong way, the rollers will not rotate when the Pickup roller shaft is turned.
  Check that the rollers rotate freely if turned towards the paper feed direction (the direction indicated by arrows in the figure below).



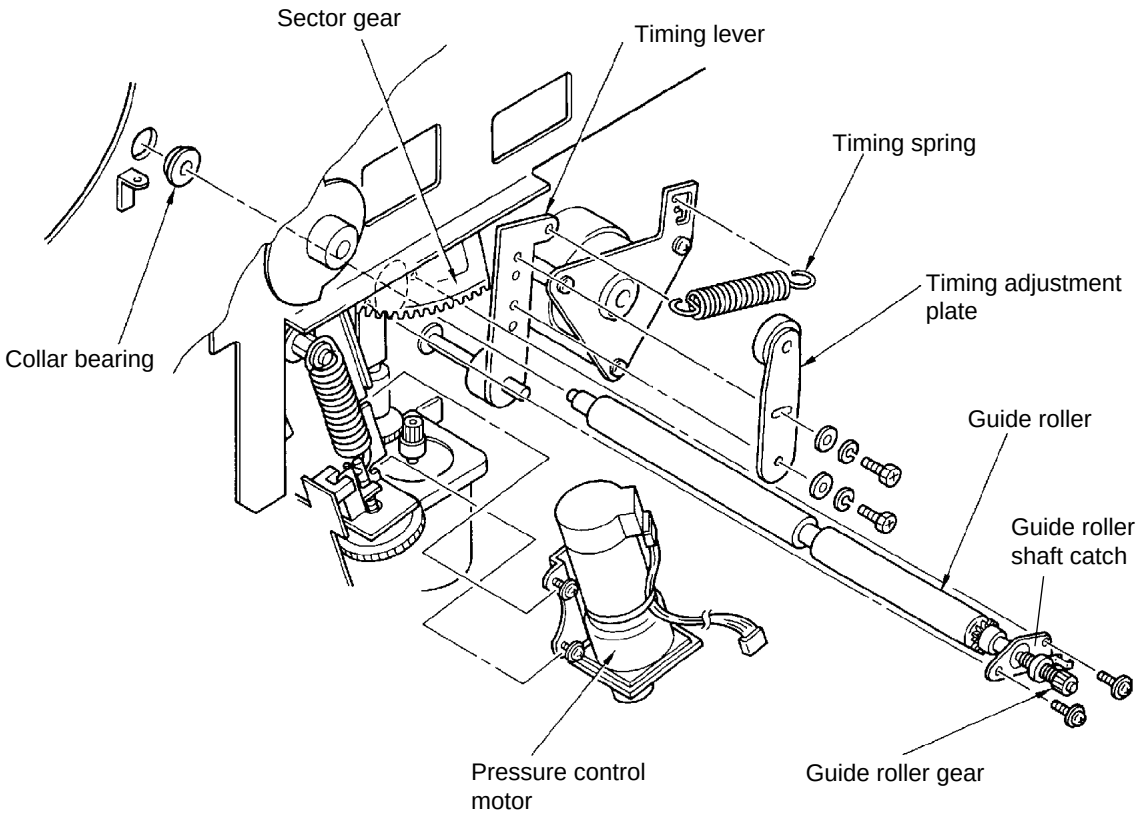
10. Guide Roller Unit

< Removal Procedure >

1. Take out the Drum from the machine, turn OFF the power and remove the Back cover.
2. Loosen two mounting screws and remove the Pressure control motor.
3. Remove two mounting screws and washers on the Timing adjustment plate, and remove the plate.
4. Remove the Timing spring.
5. Remove two mounting screws on the Guide roller shaft catch and pull out the Guide roller unit toward the Drive base side.
   [IMPORTANT]
   Be careful not to drop the collar bearing which is inserted into the side frame at the other end of the Guide roller.

- Precautions in Assembly -

- Make sure that the Guide roller gear is well but not too tightly engaged with the Sector gear.
- Put grease well on the following parts: Load spring, One-way spring, Sector gear and Guide roller gear.
- Always check if the Timing lever and Timing adjustment plate are correctly installed and the Timing roller is parallel with the Guide roller after assembly. (Refer to the pages I-31 to I-33.)



11. One-way Spring

< Removal Procedure >

1. Loosen two mounting screws and remove the Pressure control motor.
2. Remove the E-ring at the end of the Guide roller shaft.
3. Remove the Guide roller gear, turning it counter-clockwise (in the direction indicated by the arrow).
4. Remove the One-way spring, turning it counter-clockwise (in the direction indicated by the arrow).

- Precautions In Assembly -

- Put grease well on the One-way spring after assembly.
- Check that the Guide roller gear rotates when manually turning it counter-clockwise.

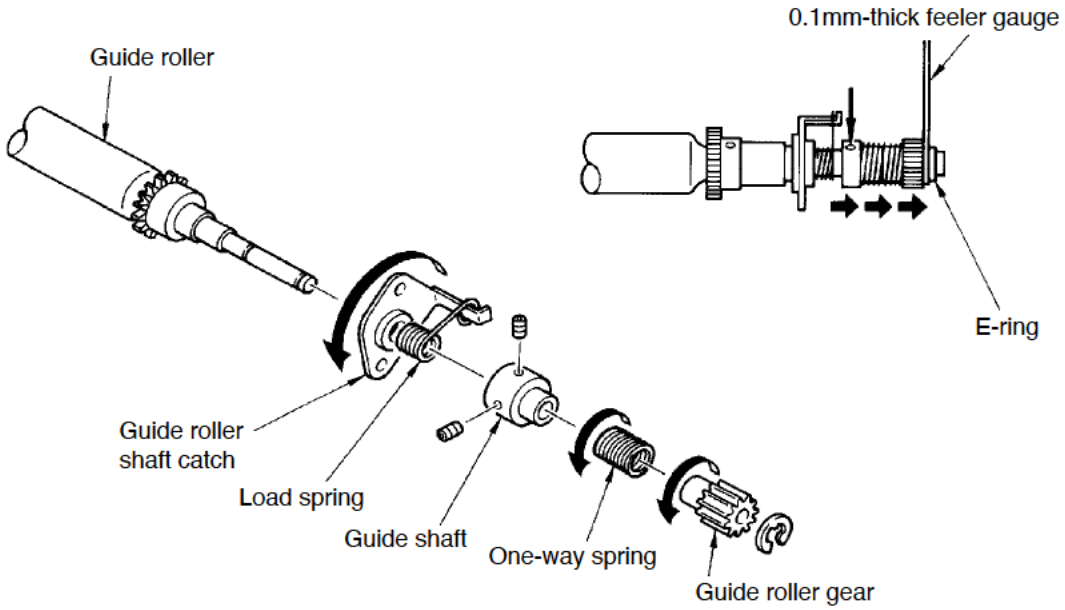
12. Load Spring

< Removal Procedure >

1. Pull out the Guide roller unit from the machine, referring to the previous page.
2. Remove the E-ring at the end of the Guide roller shaft.
3. Remove the Guide roller gear and One-way spring in order, turning them counter-clockwise (in the direction indicated by the arrow).
4. Loosen the allen screws inside the Guide shaft and remove it.
5. Remove the Load spring along with the Guide roller shaft catch, turning them counter-clockwise.

- Precautions In Assembly -

- When securing the Guide shaft on the Guide roller shaft, follow the below-described procedure after assembling the One-way spring and Guide roller gear and putting on an E-ring at the end.
  1) Insert a 0.1mm-thick feeler gauge between the Guide roller gear and the E-ring.
  2) Tighten the allen screws in the Guide shaft, pushing the Guide shaft against the Guide roller gear, and then remove the feeler gauge.
- Put grease well on the Load and One-way springs after assembly.
- Check that the Guide roller gear rotates when manually turning it counter-clockwise and scarcely shifts on the shaft.



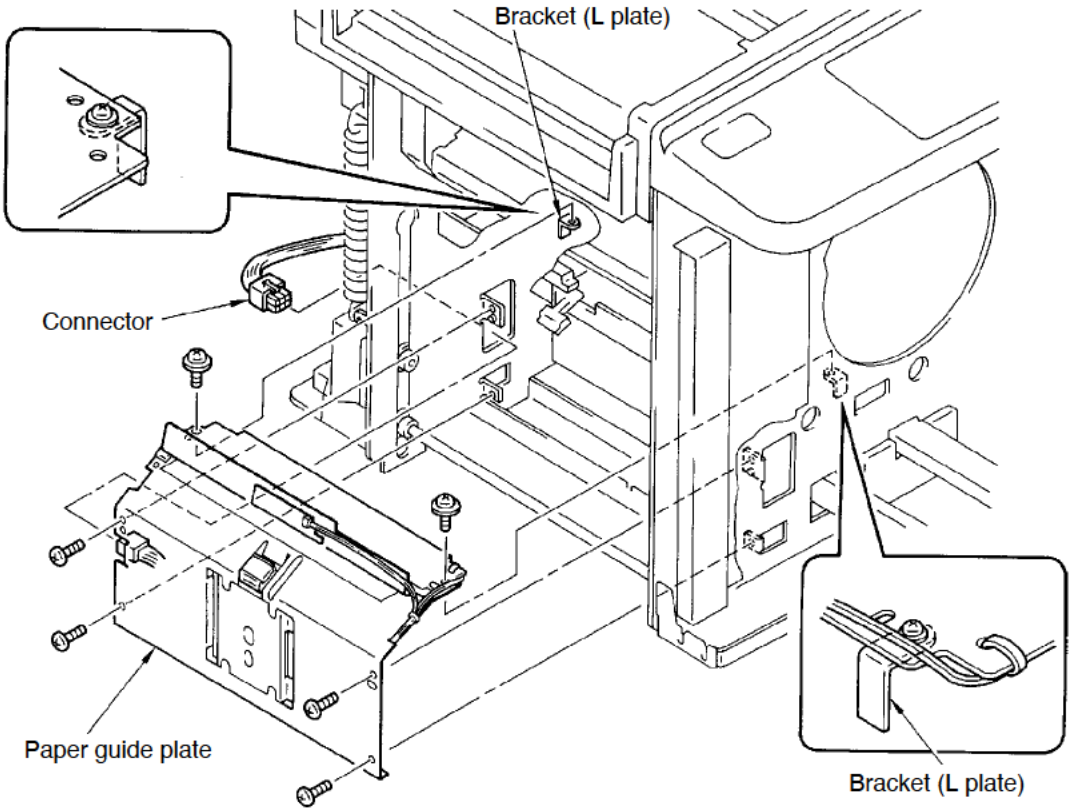
13. Paper Guide Plate

< Removal Procedure >

1. Select Test mode **No.102**.
   Press the Paper feed tray down button to raise the tray about 30mm from the bottom.
   Remove the Drum from the machine and turn OFF the power.
2. Remove the Back cover.
3. Remove the parts listed below, referring to the related pages given in the respective brackets.
   - Paper feed tray unit (p. I-15)
   - Scraper unit (p. I-21)
   - Master removal unit (p. VIII-5 or VIII-6)
   - Guide roller unit (p. I-23)
4. Disconnect the connector located on the Drive base side of the Paper guide plate.
5. Remove four mounting screws on the front of the Paper guide plate and two on the top, and take out the Paper guide plate from the machine.

- Precautions In Assembly -

- Confirm that the connector which is to be connected to the counterpart of the Paper feed tray unit is led out of the opening of the stay at the bottom of the machine before assembly.
- Before securing the Paper guide plate, make sure it is placed on the brackets (L plate) and the wires (black & orange) of the Paper sensor PCB (send) is passed on the plate to avoid wire's catching between the plate and bracket.
- Tighten the mounting screws after matching the bosses on the machine frame with the holes on the front side of the Paper guide plate.
- Always check if the Timing lever and Timing adjustment plate are correctly installed and the Timing roller is parallel with the Guide roller after assembly. (Refer to the pages I-31 to I-33.)



14. Paper Sensor PCBs
(Paper Sensor and Paper Feed Det. Sensor)

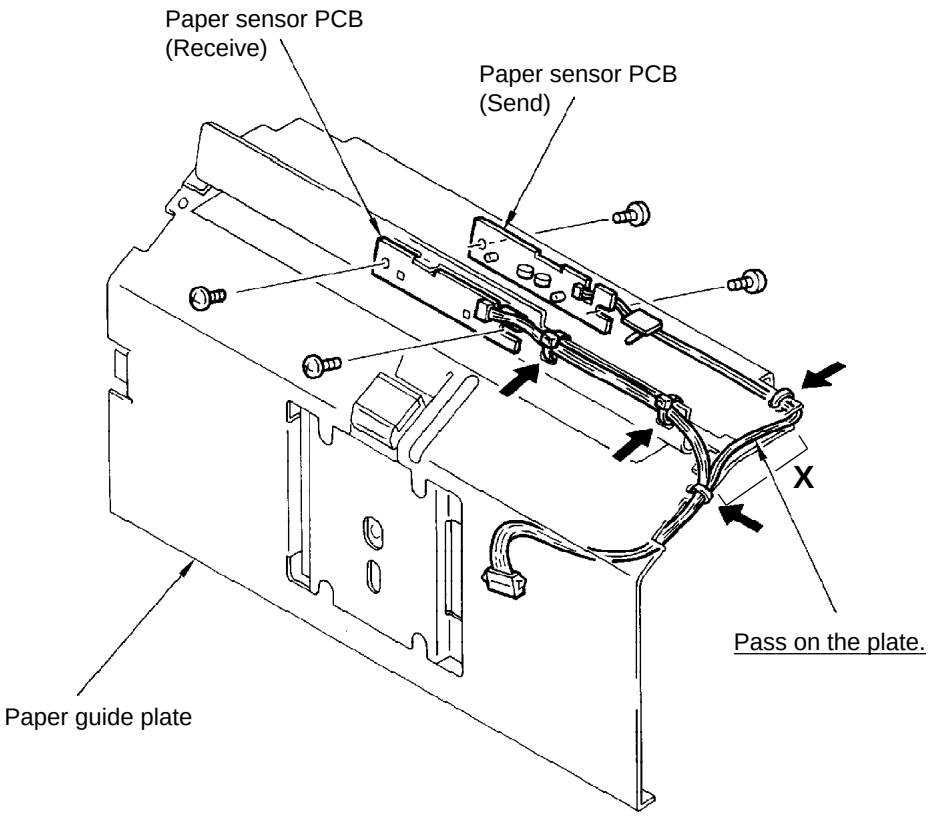
14. Paper Sensor PCBs (Paper Sensor and Paper Feed Det. Sensor)

< Removal Procedure >

1. Remove the Paper guide plate, referring to the previous page.
2. Disconnect the connectorof the Paper sensor PCBs and cut the wire clampers holding the wires of the Paper sensor PCBs.
3. Remove two mounting screws on the respective Paper sensor PCBs and remove the PCBs.

- Precautions in Assembly -

- Pass the wires of the Paper sensor PCB (send) on the Paper guide plate when leading them in the X-marked part in the figure below.



15. Stripper Unit <GR>

< Removal Procedure >

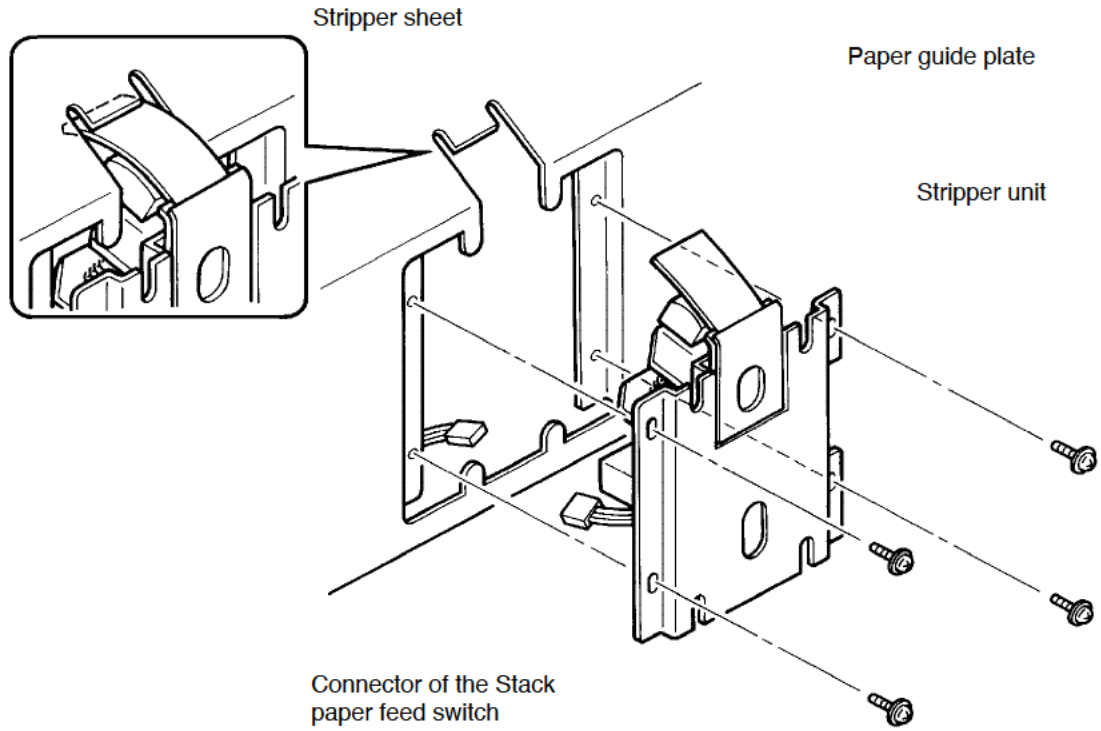
1. Bring the Paper feed tray all the way down, and turn OFF the power.
2. Remove four mounting screws securing the Stripper unit on the Paper guide plate.
3. Gently pull the Stripper unit away from the Paper guide plate and disconnect the connector of the Stack paper feed switch.
   [Note]
   Cut the wire clamper holding the wire harness of the Stack paper feed sw behind the Paper guide plate to allow the connector to be easily disconnected.

- Precaution In Removal -

- Be careful not to cut your fingers by burred edges of the Paper guide plate.

- Precautions In Assembly -

- Always hold the wire harness of the Stack paper feed sw with a wire clamper behind the Paper guide plate to prevent the Drum rail from catching the wire harness
- Do not forget to connect the Stack paper feed switch.
- Make sure to insert the top of the Stripper sheet under the Paper guide plate, as shown below.



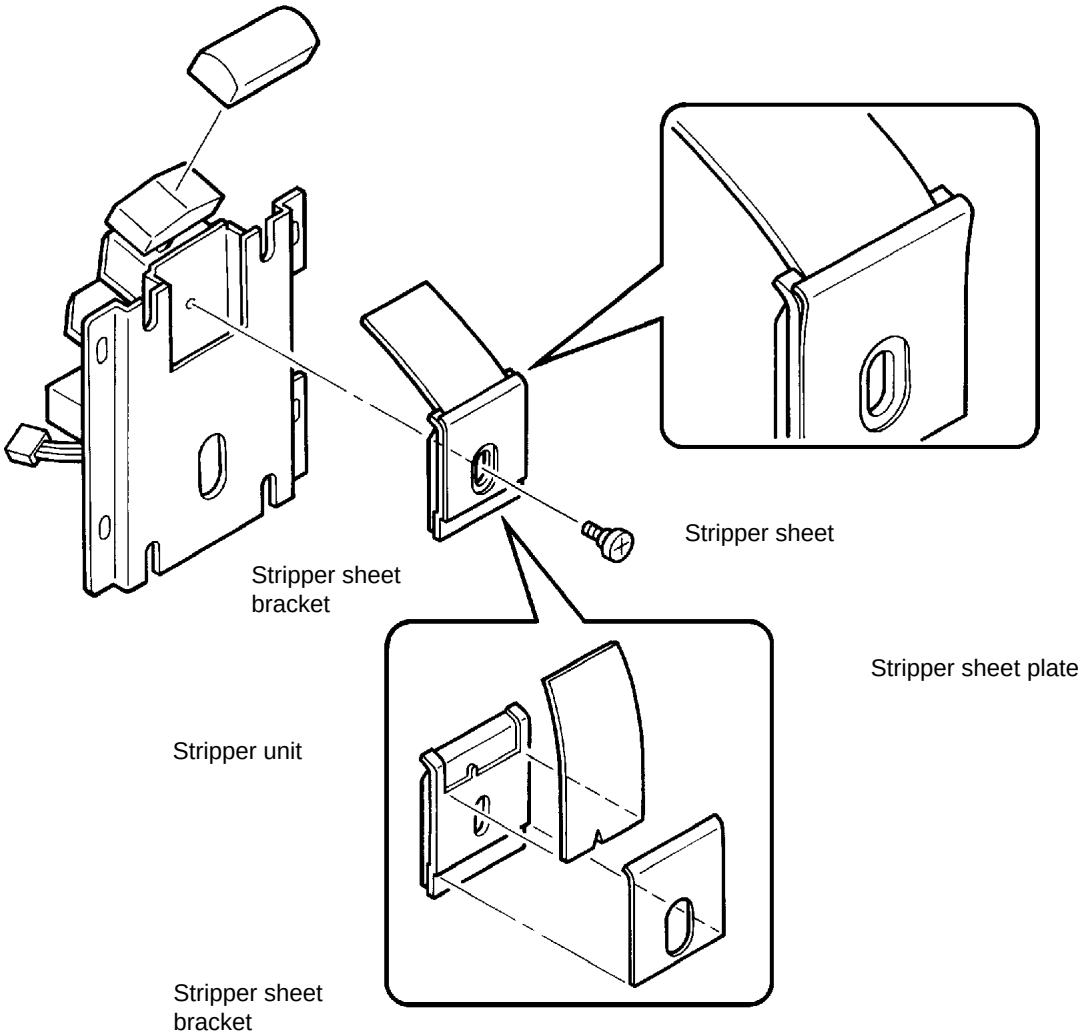
16. Stripper Sheet <GR>

< Removal Procedure >

1. Turn OFF the power and remove the Stripper unit, referring to the previous page.
2. Remove the mounting screw on the Stripper sheet ass'y and remove the ass'y.
3. It is easier to replace the whole Stripper sheet ass'y, but if wanting to replace only the Stripper sheet, peel off the Stripper sheet plate and then the Stripper sheet itself, being careful not to damage the Stripper sheet plate.

- Precautions in Assembly -

- Match the tail edge of the Stripper sheet with the bottom line of the dented square of the Stripper sheet bracket.
- After assembly, always confirm that the Stripper sheet plate holds the Stripper sheet securely without any room in between.



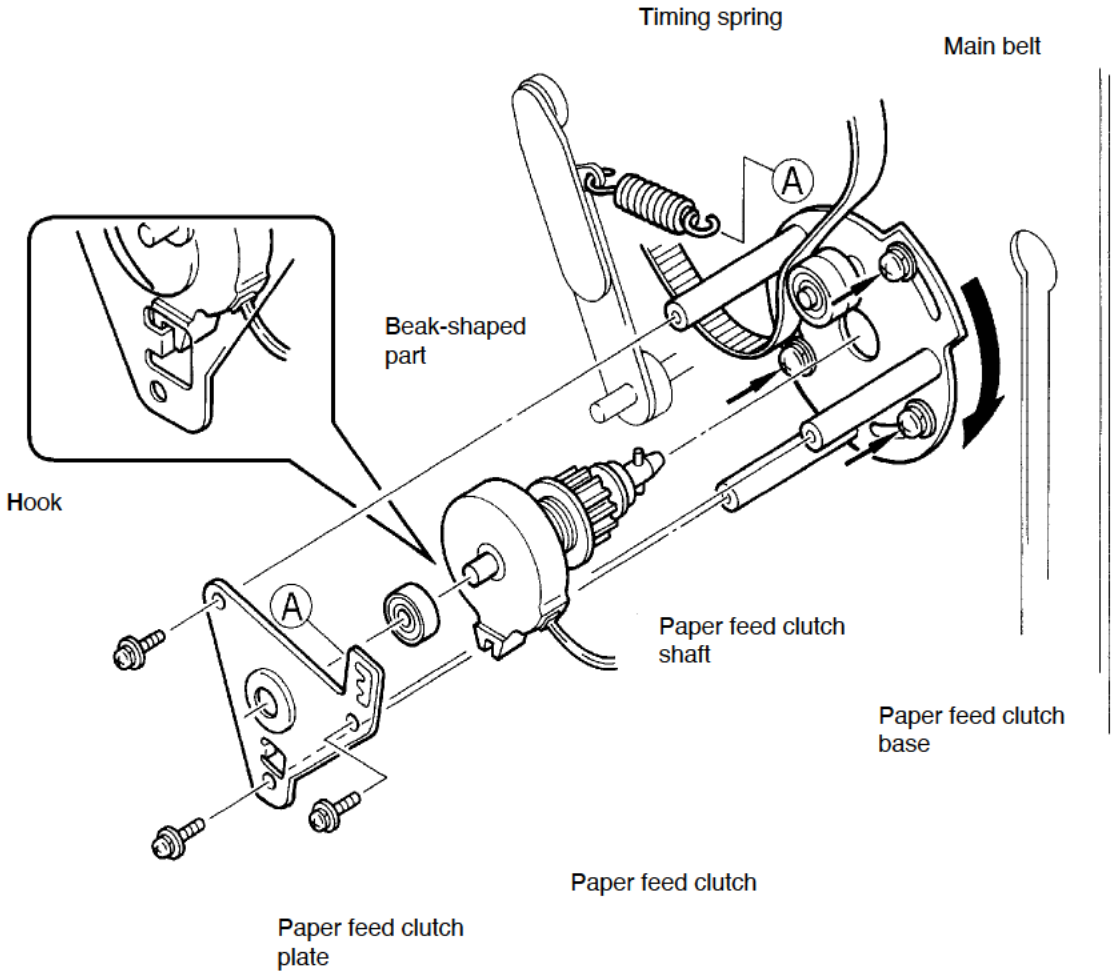
17. Paper Feed Clutch Ass'y <GR>

< Removal Procedure >

1. Turn OFF the power and remove the Back cover.
2. Remove the Timing spring.
3. Loosen three mounting screws on the Paper feed clutch base and turn the Paper feed clutch unit clockwise to release the tension of the Main belt.
4. Remove three mounting screws on the Paper feed clutch plate and remove the plate.
5. Pull the Paper feed clutch ass'y toward you and disengage the Paper feed clutch shaft from the Pickup roller shaft.
6. Disconnect the connector of the Paper feed clutch, disengage the Main belt from the Paper feed clutch pulley and remove the Paper feed clutch ass'y by pulling it further toward you.

- Precautions In Assembly -

- Make sure to engage the beak-shaped part of the Paper feed clutch with the hook of the Paper feed clutch plate.



1. Paper Feed Section

[Adjustment]

1. Position of Elevator Upper Limit Sensor

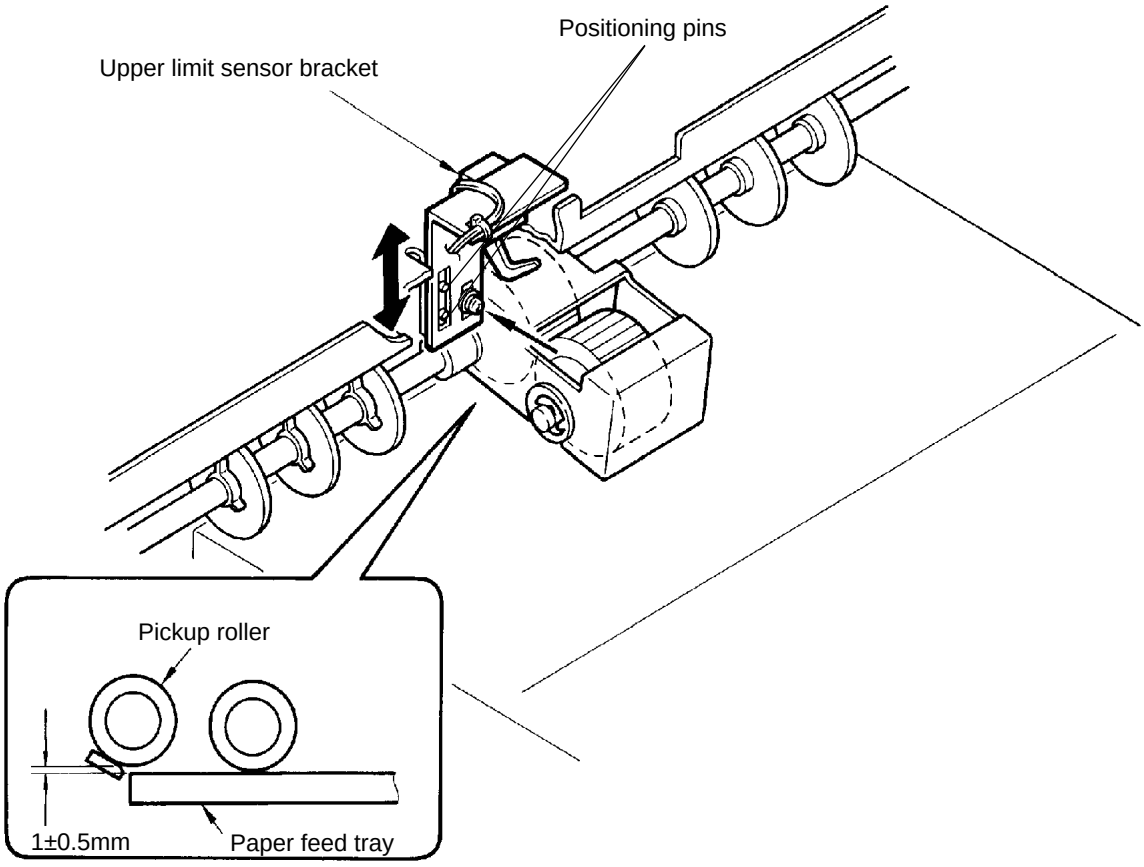
1. Remove paper from the Paper feed tray.
2. Enter Test mode **No.102**.
3. Press the Elevator down botton until the Paper feed tray elevates and stops at the top position.
4. Confirm that the gap between the Pickup roller and the Paper feed tray is **1±0.5mm**.
5. If the measurement is off, loosen the screw holding the Upper limit sensor bracket and move the bracket up or down to adjust the top position of the Paper feed tray.

- Precautions in Adjustment -

- Do not confuse the Pickup roller with the Scraper roller when measuring the space.
- Make sure that two positioning pins are located in the rectangular hole of the Upper limit sensor bracket when tightening the screw.

- Results of Misadjustment -

- If the Upper limit sensor is set too high;
  the paper feed pressure becomes strong and multiple sheet feedings will occur.
- If the Upper limit sensor is set too low;
  the paper feed pressure becomes weak and paper will skip or misfeed.

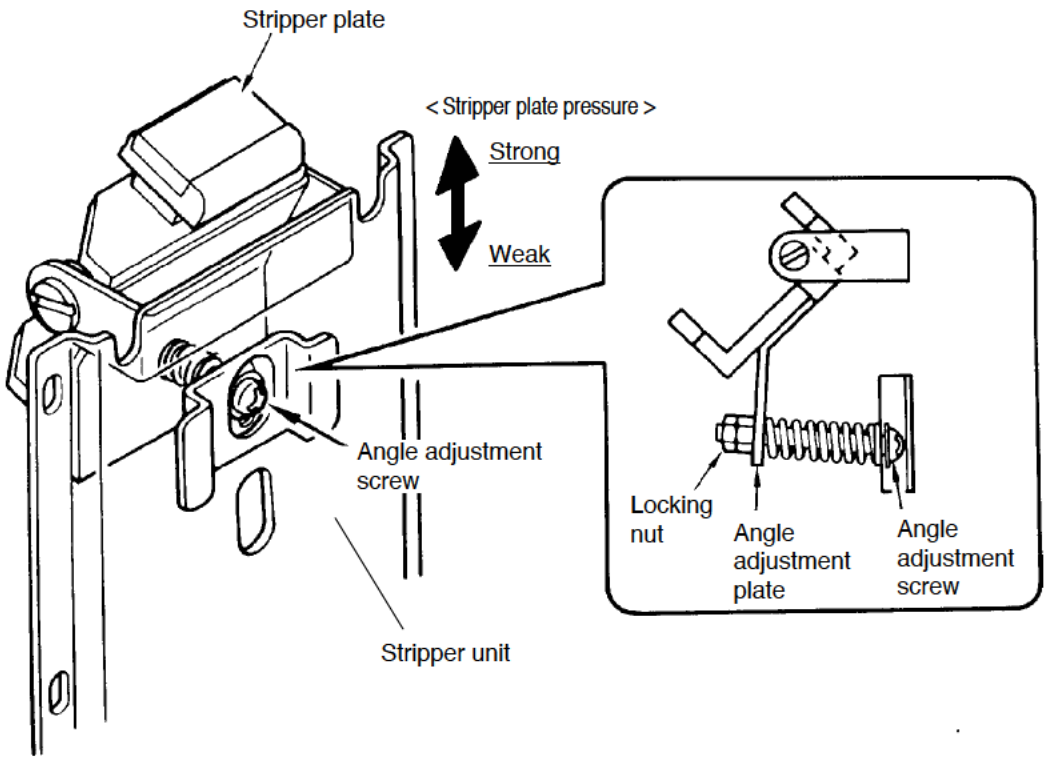


2. Stripper Plate Pressure

1. Load paper on the Paper feed tray and position the Paper feed pressure adjustment lever according to the weight of the loaded paper.
   Check paper feeding condition by operating the machine.
2. If multiple sheets of paper are fed, rotate the Angle adjustment screw counter-clockwise or raise the mounting position of the Stripper unit, to increase the Stripper plate pressure.
3. If paper slips, rotate the Angle adjustment screw clockwise or lower the mounting position of the Stripper unit, to decrease the Stripper plate pressure.

- Precautions In Adjustment -

- Always confirm that the Elevator upper limit sensor is correctly positioned, referring to the previous page, before adjusting the Stripper plate pressure.
- Always check that the Stack paper feed sw is correctly positioned after adjustment.
- If the surface of the Stripper plate is smudged or worn, multiple sheets of paper may be fed.

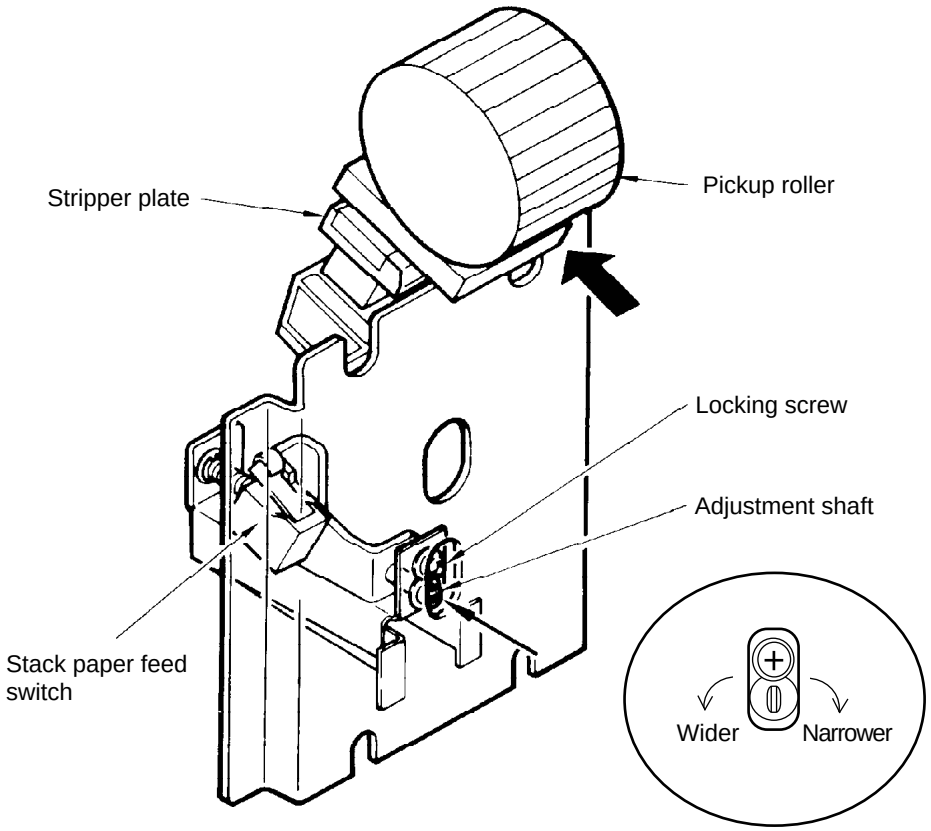


3. Position of Stack Paper Feed Switch

1. Check if the Stack paper feed switch is actuated ON when inserting a 1.5mm-thick feeler gauge between the Pickup roller and the Stripper plate (or when pressing down the Stripper plate with a finger by about 1.5mm).
   When the switch is actuated ON, a click will be heard.
2. If the switch is not actuated ON as described above, loosen the locking screw and adjust the position of the Stack paper feed switch by turning the adjustment shaft.
   - Turning it clockwise - Decreases the space between the switch and the actuating plate below the Stripper plate.
   - Turning it counter-clockwise - Increases the space between the switch and the actuating plate below the Stripper plate.
3. Tighten the locking screw and check that paper is fed without any troubles by operating the machine.

- Results of Misadjustment -

- If the space between the Stack paper feed switch and the actuating plate is too narrow or none; the Stack paper feed switch is actuated ON in normal paper feeding or from the start of operation, preventing the Paper feed clutch from operating because the machine assumes that multiple sheets of paper have been fed.
  As a result, the error code **[E 33]** will be displayed on the operation panel to interrupt operation.
- If the space between the Stack paper feed switch and the actuating plate is too wide; the Stack paper feed switch isn't actuated ON to interrupt the Paper feed clutch's operation when multiple sheets of paper are fed, causing multiple sheets to be stuck in the second paper feed section.
  In the worst case, the Drive mechanism may be locked up or the Paper guide plate may be deformed.



4. Position of P Disc (Start-time of First Paper Feed)

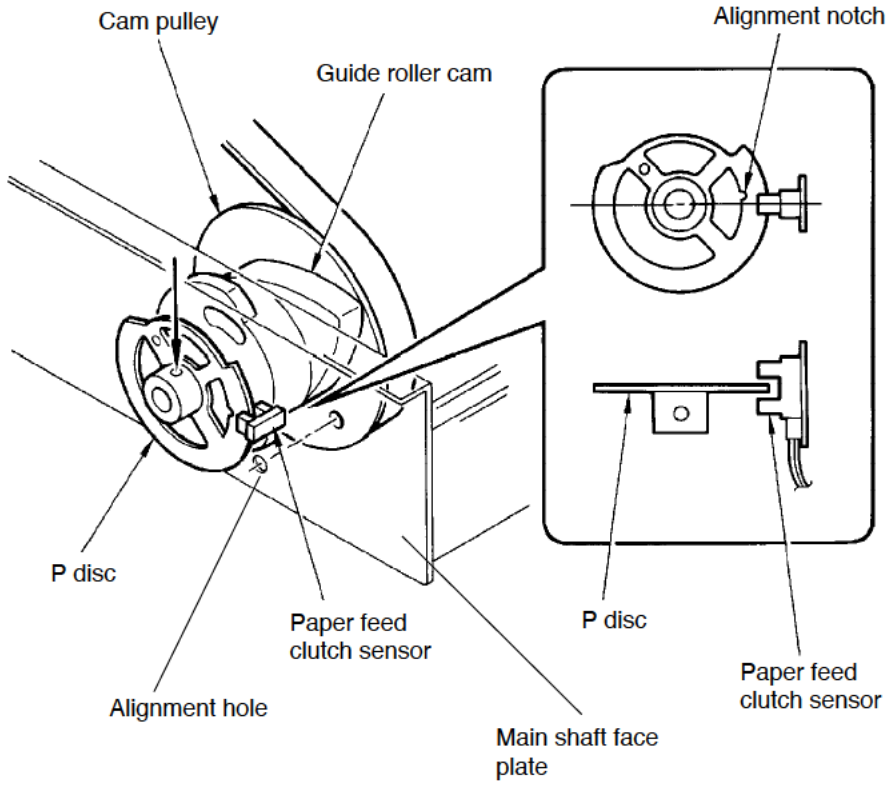
1. Check that the vertical print position is at the center and the Drum at the home position.
2. Check if the alignment notch of the P disc is positioned on a level with the top corner of the Paper feed clutch sensor as shown in the figure below.
3. If not, first check if the hole on the Main shaft face plate is aligned with the counterpart on the Cam pulley.
   If it is not aligned, adjust the arrangement of the Cam pulley, referring to the page I-35.
4. If the alignment notch of the P disc is still not correctly positioned after confirming the hole alignment for the Cam pulley, loosen the allen screw securing the P disc and turn the P disc so that the alignment notch is positioned on a level with the top corner of the Paper feed clutch sensor.
5. Tighten the allen screw inside the P disc.
   [IMPORTANT]
   Secure the P disc so that it is positioned in the middle of the Paper feed clutch sensor as shown in the figure below.

- Precautions In Adjustment -

- Make sure that the P disc doesn't get contact with the inner surface of the Paper feed clutch sensor at any position by rotating the P disc with a press of SW1 on the System PCB.

- Results of Misadjustment -

- If the P disc is incorrectly positioned;
  paper will not feed correctly, causing paper feed errors or making print position unstable.



5. Position of Timing Adjustment Plate

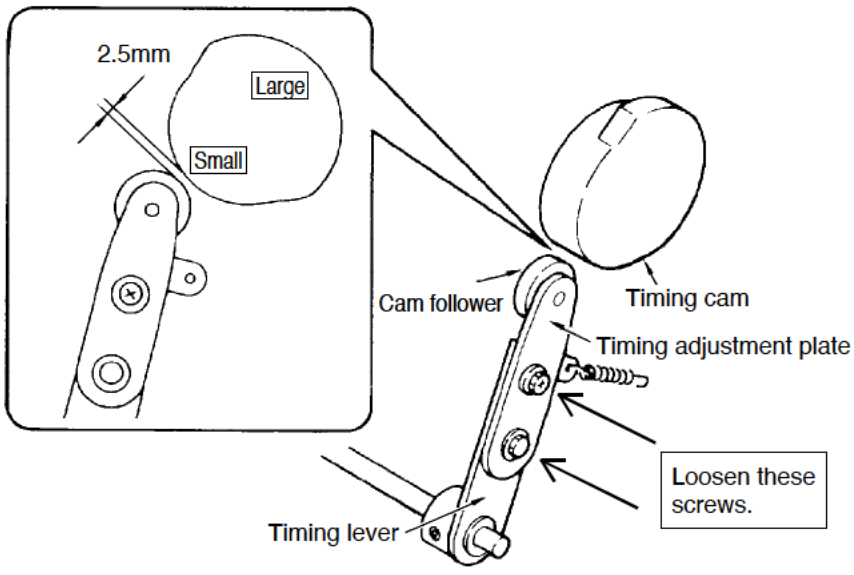
1. Rotate the drive mechanism so that the small round part of the Timing cam faces the cam follower on the Timing adjustment plate, by pressing **SW1** on the **System PCB**.
   Turn OFF the power.
2. Check if the gap between the Timing cam and the cam follower on the Timing adjustment plate is approx. **2.5mm** (for example, by inserting a 2.5mm-thick hexagonal wrench between).
3. If not, loosen two securing screws on the Timing adjustment plate and adjust the position of the plate to get a 2.5mm-wide gap.
4. Tighten the securing screws on the Timing adjustment plate.

- Precautions In Adjustment -

- If a 2.5mm-wide gap can't be secured by adjusting the position of the Timing adjustment plate or if the Timing adjustment plate can't but be positioned doglegged to secure a 2.5mm-wide gap, adjust the position of the Timing lever before adjusting the position of the Timing adjustment plate.
  (Refer to the following page for the adjustment procedure of the Timing lever's position.)
  [IMPORTANT]
  If the Timing adjustment plate is set doglegged, paper, especially cardboard, may not smoothly feed through the second paper feed section due to the change of the Timing spring's pressure.

- Results of Misadjustment -

- If the gap between the Timing cam and the cam follower on the Timing adjustment plate is narrower than 2.5mm;
  the Timing roller is lowered too much and too early, which causes the Drive gear B to be disengaged from the Drive gear A when the Timing roller is set at the lowest position and shortens the paper feed range from the second paper feed section.
  As a result, a loud scratching noise will sometimes be heard during printing and paper will not feed smoothly through the second paper feed section, especially for the first sample print.
- If the gap between the Timing cam and the cam follower on the Timing adjustment plate is wider than 2.5mm;
  the Timing roller is raised too early and lowered too late.
  As a result, the trailing part of a fed sheet will be caught by the Timing roller, which makes ghost images (double images) liable to appear on the top part of printed copies.

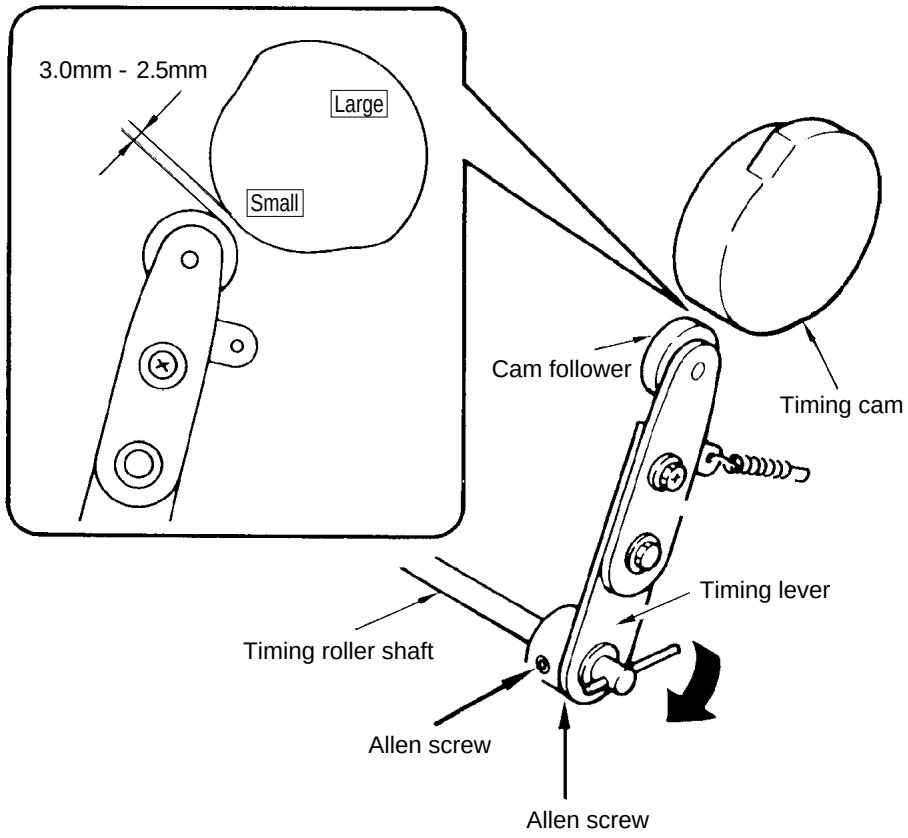


6. Position of Timing Lever

1. Check that the Timing adjustment plate is attached to the Timing lever in a line.
2. Rotate the drive mechanism so that the small round part of the Timing cam faces the cam follower on the Timing adjustment plate, by pressing **SW1** on the **System PCB**.
   Turn OFF the power.
3. Loosen two allen screws inside the root of the Timing lever on the Timing roller shaft.
4. Secure a **3mm**-wide gap between the Timing cam and the cam follower on the Timing adjustment plate (for example, by inserting a 3mm-thick hexagonal wrench between).
5. Insert a bar (like an allen key) into the hole at the end of the Timing roller shaft and turn the shaft clockwise to set the Timing roller in close contact with the Guide roller.
   [IMPORTANT]
   Confirm that the Drive gears on the roller shafts engage by moving the Sector gear by hand (to rotate the Guide roller).
6. Holding the shaft in this position, tighten the allen screws inside the root of the Timing lever.
7. Adjust the position of the Timing adjustment plate to change the gap between the Timing cam and the cam follower on the Timing adjustment plate to **2.5mm**, referring to the previous page.

- Precautions in Adjustment -

- Secure the Timing lever in the way it does not get in contact with the Main shaft face plate and Sector gear.



7. Parallelism of Timing Roller

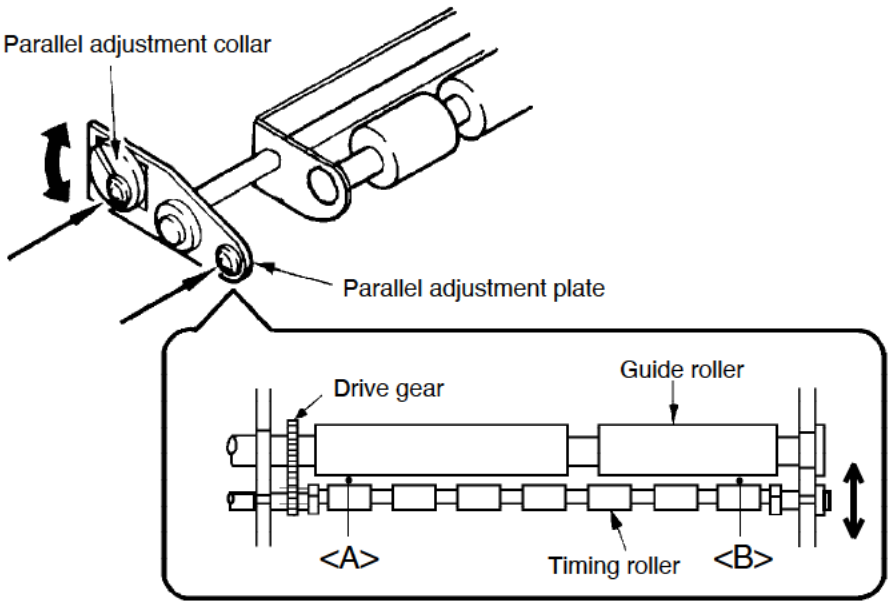
1. Take out the Drum from the machine and remove the Back cover.
2. Cut two strips of paper longways.
   Insert the paper strips through the Paper guide plate and into between the Guide roller and the Timing roller at the two points (A and B) indicated in the figure below.
3. Rotate the drive mechanism until the Timing roller is raised and the paper strips start to feed, by pressing **SW1** on the **System PCB**.
4. By pulling the paper strips toward you, check if they are gripped with equal pressure .
5. If not, loosen the securing screws on the Parallel adjustment plate and collar and turn the adjustment collar to adjust the balance of the Timing roller.
   [IMPORTANT]
   Check that the gap between the Timing cam and the cam follower on the Timing adjustment plate is correctly adjusted after adjusting the parallelism of the Timing roller.
   (Refer to the page I-31.)

- Precautions In Adjustment -

- Make sure that paper strips are securely gripped by the rubber rollers of the Timing roller when the Timing roller is raised.

- Results of Misadjustment -

- If the Timing roller is not parallel to the Guide roller;
  paper may be pulled to one side in feeding through the second paper feed section.
  As a result, paper will skew or be wrinkled.



8. Vertical Print Position

There are two kinds of adjustment procedures for the vertical print position depending on the degree of difference in image position between an original and a printed copy as follow.

- If the difference is **less than 12mm**; - Adjust **(1) Position of Guide Roller Cam**.
- If the difference is **12mm or more**; - Adjust **(2) Arrangement of Main and Cam Pulleys**.

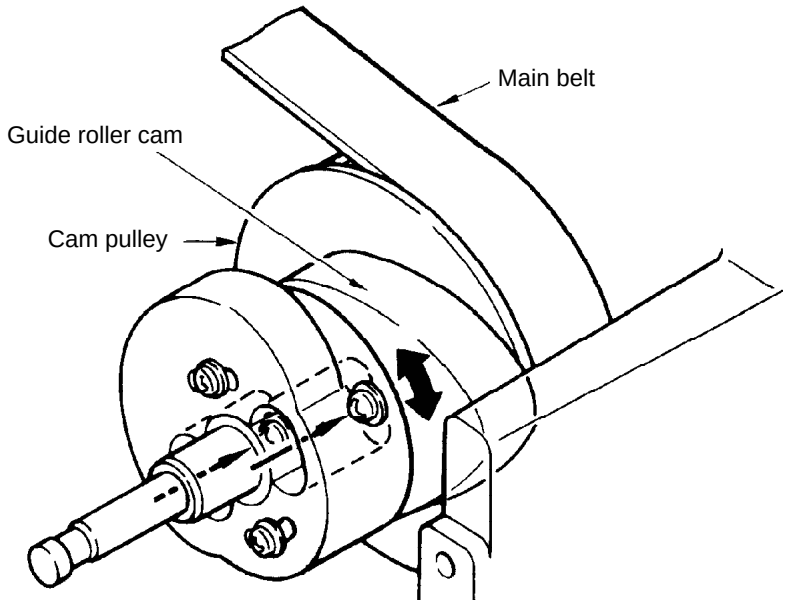
[IMPORTANT]
Remember that the following adjustment should be applied after confirming that the master-making and -loading positions are correct.

(1) Position of Guide Roller Cam

1. Check that images are transferred into the correct area on a master and the master is correctly loaded on the Drum.
   If no error is found in the master-making and -loading operations, make a new master with Test chart **No.8** as an original.
2. First move the print position toward the bottom by the Print position button and return it to the center by the "Centering" button. Then print **5 to 10** copies at **speed 3**.
3. Check if a degree of discrepancy of registration between on the original and on printed copies is within allowance. The allowance is **2mm** toward the bottom but **none** toward the top.
4. If it is beyond the allowance but **within12mm**, loosen two mounting screws on the Guide roller cam and adjust the installation position of the cam.
   [Note]
   - If the cam is moved clockwise, - the print position is shifted toward the bottom.
   - If the cam is moved counter-clockwise, - the print position is shifted toward the top.
5. Tighten the mounting screws on the Guide roller cam and check the print position by repeating the procedure in the step 2 above.

- Precautions in Adjustment -

- Don't loosen the mounting screws on the Timing cam. If they are loosened by mistake, secure them at the middle of the long hole.
- Move the Guide roller cam a little by a little because the vertical print position will be changed by more than 12mm only by adjusting the Guide roller cam's installation position.

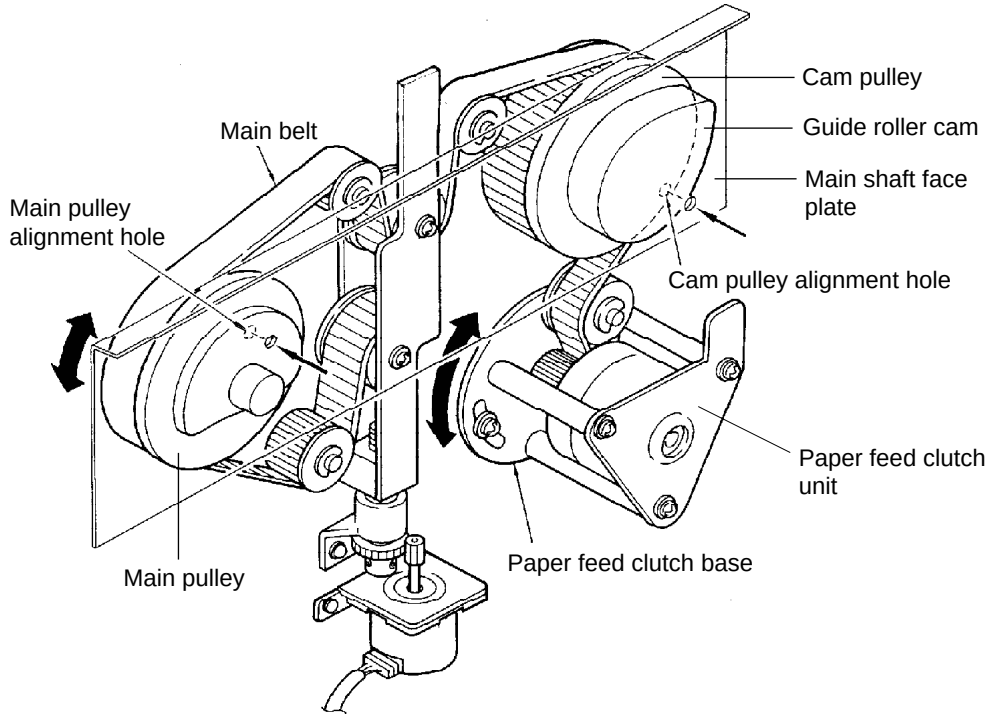


(2) Arrangement of Main and Cam Pulleys

1. Return the print position to the center by the "Centering button and rotate the Drum to the home (A-plate detection) position.
2. Check if the holes on the Main shaft face plate are aligned with the counterparts on the Main pulley and Cam pulley.
3. If not, loosen three mounting screws on the Paper feed clutch base and turn the Paper feed clutch unit clockwise to release the tension of the Main belt.
4. Disengage the Main belt from the Cam pulley and turn the pulley so that the hole on the pulley is aligned with the counterpart on the Main shaft face plate.
5. Engage the Main belt with the Cam pulley and turn the Paper feed clutch unit counter-clockwise to apply tension to the Main belt.
   Tighten the mounting screws on the Paper feed clutch base while applying tension.
   [Note]
   When applying tension to the Main belt, the Cam pulley alignment hole will move down a little or the Main pulley alignment hole will move up a little.
6. Check the hole alignment once more to confirm the correct arrangement of the Main and Cam pulleys.
   After confirming the correct arrangement of the pulleys, check the print registration following the adjustment procedure of the Guide roller cam's installation position.
   (Refer to the previous page.)

- Results of Misadjustment -

- If the Guide roller cam is not positioned correctly or the Main and Cam pulleys are not correctly arranged ;
  1) the print registration will still be incorrect.
     The print position is shifted about 12mm by one-gear-tooth discrepancy of the arrangement of the Cam pulley.
  2) paper will not feed properly and jam in the second paper feed section, causing the error code **[E 31]** to be displayed on the operation panel in case the discrepancy is too large.
  3) printed paper will stick on the drum, causing the error code **[E 34]** to be displayed on the operation panel in case the print position is shifted toward the top too much.



9. Position of P Disc (Start-time of First Paper Feed) <GR>

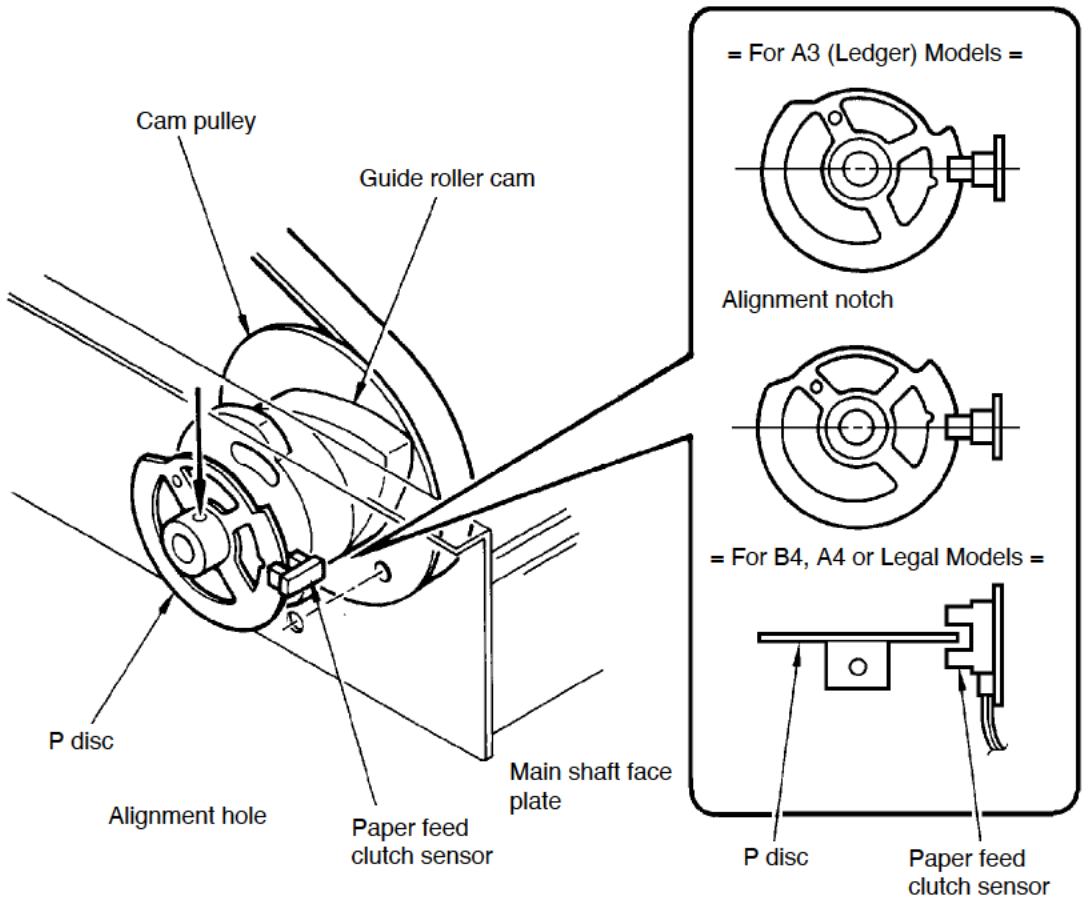
1. Check that the vertical print position is at the center and the Drum at the home position.
2. Check if the alignment notch of the P disc is positioned as indicated below.
   - For A3 (Ledger) models : on a level with the bottom corner of the Paper feed clutch sensor
   - For B4, A4 or Legal models : on a level with the top corner of the Paper feed clutch sensor
3. If not, first check if the hole on the Main shaft face plate is aligned with the counterpart on the Cam pulley.
   If it is not aligned, adjust the arrangement of the Cam pulley, referring to the page I-35.
4. If the alignment notch of the P disc is still not correctly positioned after confirming the hole alignment for the Cam pulley, loosen the allen screw securing the P disc and turn the P disc so that the alignment notch is positioned as indicated above.
5. Tighten the allen screw inside the P disc.
   [IMPORTANT]
   Secure the P disc so that it is positioned in the middle of the Paper feed clutch sensor as shown in the figure below.

- Precautions In Adjustment -

- Make sure that the P disc doesn't get contact with the inner surface of the Paper feed clutch sensor at any position by rotating the P disc with a press of SW1 on the System PCB.

- Results of Misadjustment -

- If the P disc is incorrectly positioned;
  paper will not feed correctly, causing paper feed errors or making print position unstable.



2. Press/Rotation Section

[Theory of Operation]

1. Drum Rotation Control System

- Rotation of Main Pulley

The Main motor provides the drive for the rotation of the Main pulley via the Cam pulley and Main belt.

- Rotation of Drum

The Main pulley is attached on the Main shaft, which is engaged with the Main shaft catch of the Drum.

While the Main motor is operating, therefore, the Drum is rotating, driven by the Main shaft.

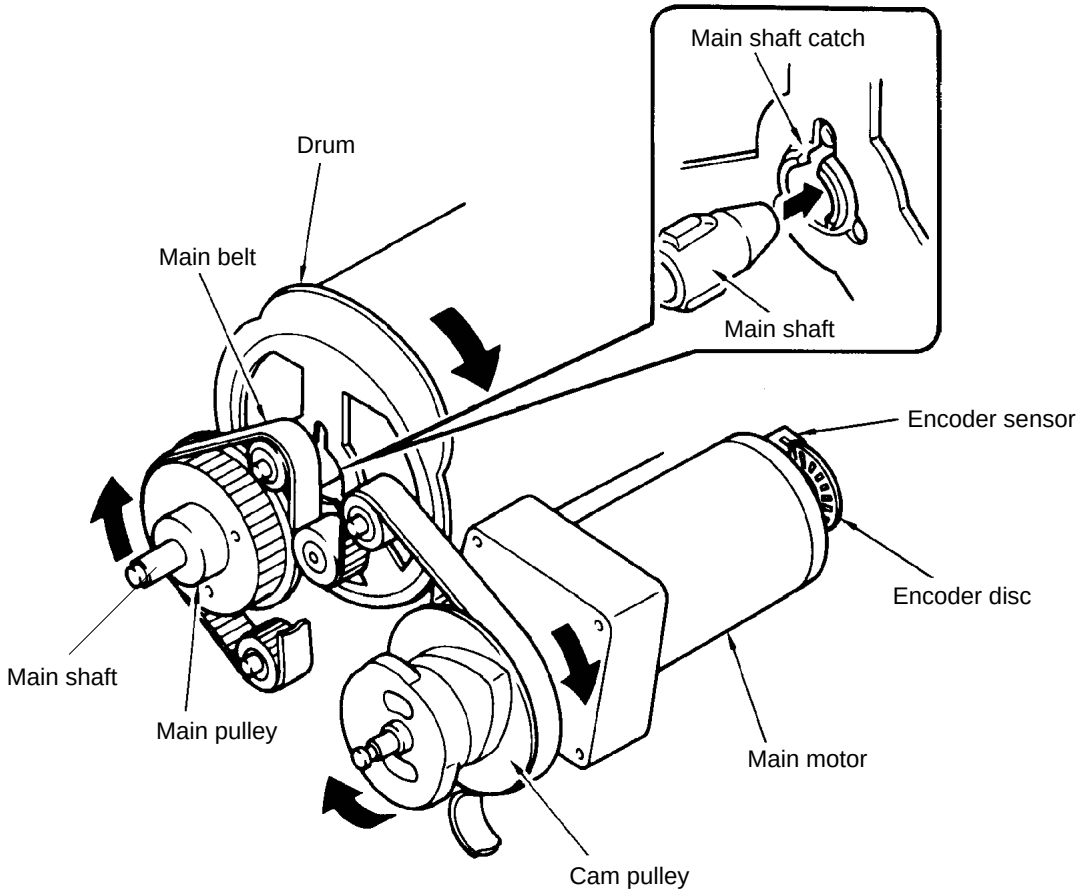
- Control of Rotation Speed

The Main motor speed is controlled by the Encoder disc and sensor, which are attached on the top of the Main motor.

The Encoder sensor counts the number of slits of the Encoder disc which has passed the sensor in given period, and controls the actual drum rotation speed.

- Home-positioning of Drum

When the Front cover is opened and the Drum home position buton (indicator) is pressed, the Main motor operates until the light path of the Position A sensor is blocked by the Plate A to rotate the Drum up to the home position where the Drum can be pulled out of the machine.



2. Press System

- Conversion of Rotation to Up-and-Down Motion via Pressure Cam

The Pressure cam, which is attached to the Main pulley, continuously rotates clockwise via the Main belt, which drives the Main pulley, when the Main motor rotates.
The rotation of the Pressure cam provides the drive for the Linking plate.
As the cam follower of the Linking plate contacts the Pressure cam, the high and low points of the cam convert the rotation movement of the cam to an up-and-down motion of the Linking plate.

- The Up-and-Down Motion of Pressure Hook

The up-and-down motion of the Linking plate is conveyed to the Pressure hook through the Pressure links. The Pressure hook moves up and down with the Pressure shaft as the fulcrum.

- Operation of Pressure Solenoid

The Pressure solenoid, which is attached to the Pressure hook and Hook lever assembly, functions to engage the Hook lever assembly with the Pressure lever.

- Control of Pressure Solenoid

The Pressure solenoid is activated ON when paper is detected by the Paper sensor while the Print signal is output (ON). When the Pressure solenoid is activated ON, the Hook lever assembly is engaged with the Pressure lever.

[Note]

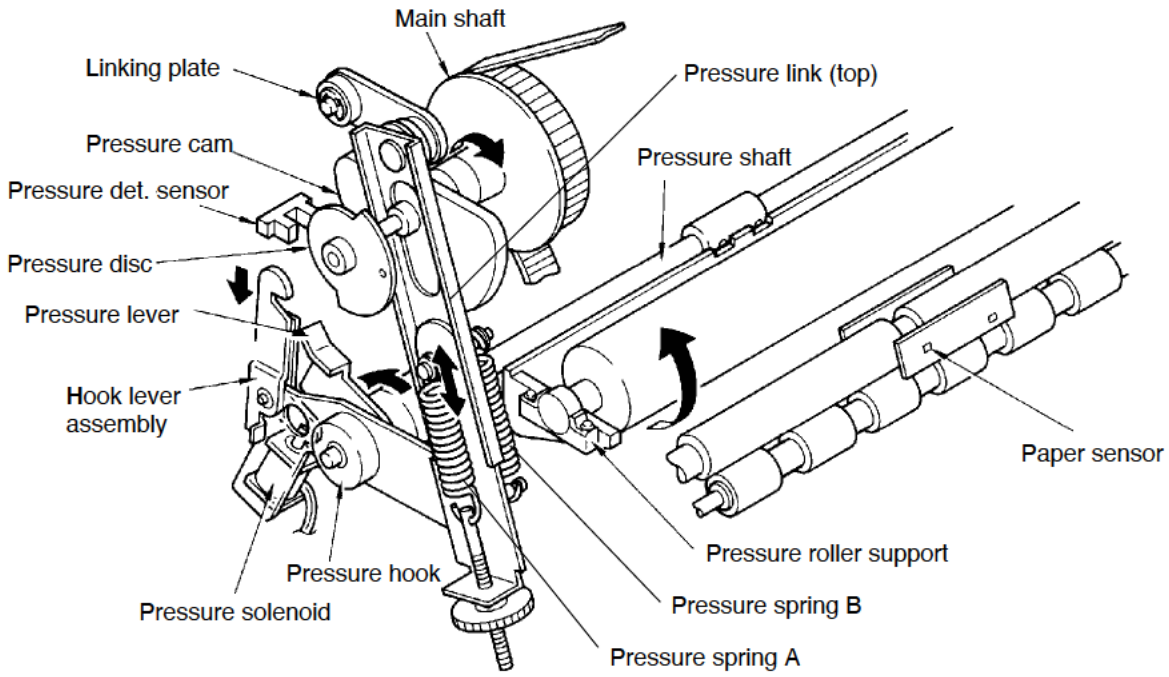
The Pressure solenoid is deactivated when the light path of the Pressure detection sensor is just opened during the rotation of the Pressure disc.

- Lifting of Pressure Roller

While the Hook lever assembly is engaged with the Pressure lever, the Pressure lever is pulled down by the descending Hook lever, turning the Pressure shaft counter-clockwise because the Pressure lever is attached on the Pressure shaft.
To the Pressure shaft is attached the Pressure roller support on which the Pressure roller is placed. Therefore, when the Pressure shaft rotates counter-clockwise, the Pressure roller is lifted up to the Drum, pressing a sheet of paper against the Drum.

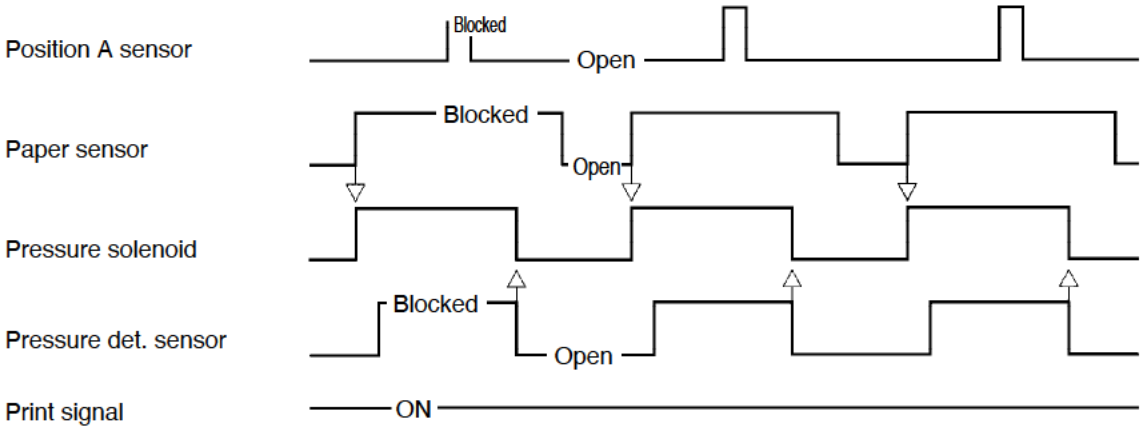
- Function of Pressure Links

While the Pressure roller is in contact with the Drum, the Pressure link (top) is raised by the Pressure cam, pulling the Pressure springs A and B to apply pressure to the Drum and transfer ink from the Drum onto a sheet of paper.



- Timing Chart -

Press System



3. Pressure Regulation System

- Basic

The printing density is changed by turning ON the Pressure control motor.
The Pressure control motor changes the printing pressure by controlling the length of the Pressure springs.
The printing pressure, broken down into 12 levels, is determined by the print density setting, print speed setting and the temperature of ink (inside the drum).
The Pressure control sensor keeps track of the initial pressure position (home position).

- Pressure Regulation System

The pressure control motor rotates up or down to a specified position.
This motion is conveyed to the Print pressure adjustment screw via the Print pressure adjustment gear, changing the tension (pull power) of the Pressure spring, which changes the print pressure.
An encoder sensor is attached on top of the Pressure control motor to count the number of rotation the motor has made. (One motor rotation is converted into 5 pulse counts.)

- Initial Pressure Position (home position) -- Pressure Level No.7

The machine looks for the initial pressure position each time the main power is turned ON or All Reset button is pressed.
In this case, the Pressure control motor operates depending on the condition of the Pressure control sensor, as described below.

- **If the light path of the Pressure control sensor is open ;**
  The Pressure control motor rotates until the light path is blocked by the Bracket B, then rotates in the reverse direction until the light path is opened again.
- **If the light path of the pressure control sensor is blocked by the Bracket B:**
  The Pressure control motor rotates until the light path of the sensor is opened.

The initial (home) pressure position of the printing pressure is Level No.7
Once the initial pressure position is achieved, the Pressure control motor rotates until the pressure level is adjusted to the equivalent of Print speed No.1. The printing starts from the low speed and is increased, changing the pressure at the same time, until a selected speed is achieved.

- At Speed-change Mode

When the Print speed button on the operation panel is pressed to change the printing speed, the pressure is increased as the speed is increased to keep the print density constant.

[Note] If the Print speed button is pressed while the machine is in idle, the Pressure control motor does not rotate until printing starts.

- At Density-change Mode (Not available for RA4200)

When the Print density button on the operation panel is pressed to change the print density, the pressure is increased as the density is increased.

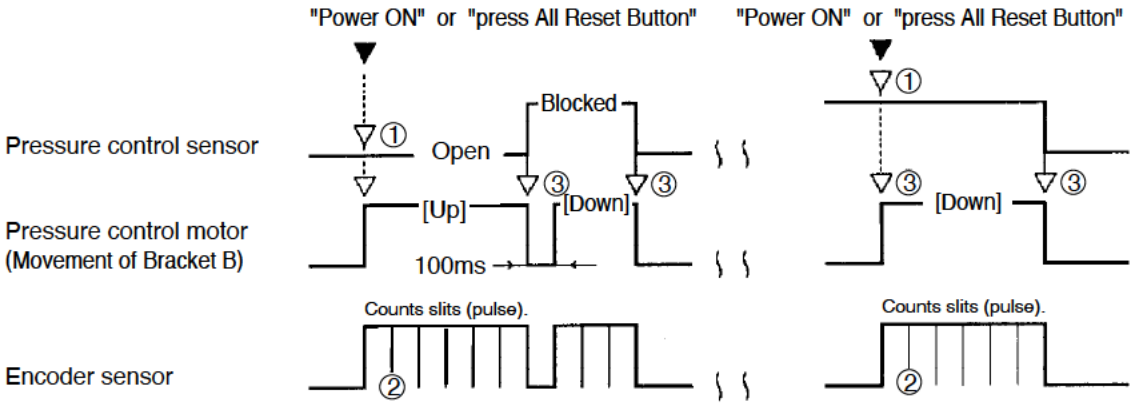
[Note] If the Print density button is pressed while the machine is in idle, the Pressure control motor does not rotate until printing starts.

In-drum Temperature \ Print Speed Setting <Print Density>			1 (1st print)	2	3	4	5
~7.5°C	(~46°F)	<~B1>	Level 8	Level 9	Level 10	Level 11	Level 12
7.5~15.0°C	(46~59°F)	<B0~9C>	Level 6	Level 7	Level 8	Level 9	Level 10
15.0~22.5°C	(59~73°F)	<9B~86>	Level 4	Level 5	Level 6	Level 7	Level 8
22.5~30.0°C	(73~86°F)	<85~72>	Level 2	Level 3	Level 4	Level 5	Level 6
30.0°C~	(86°F~)	<71~>	Level 1	Level 2	Level 3	Level 4	Level 5

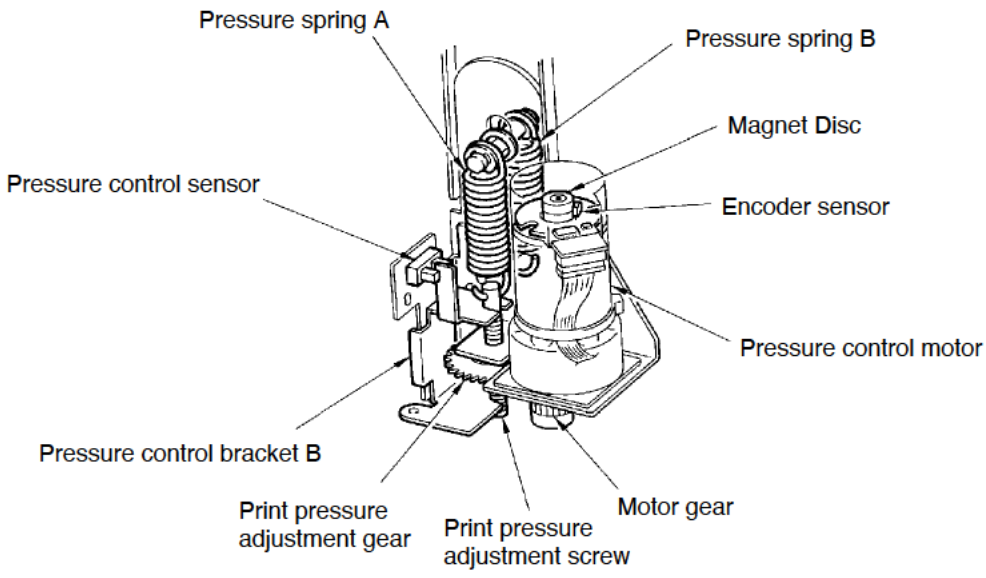
* "Level 1" corresponds to the lowest print pressure and "Level 12" the highest.
* The hexadecimal number in "< >" indicates a digital display of temperature in the drum which is displayed on the operation panel in Test mode No.115.

- Timing Chart -

Pressure Regulation System (Initial Movement)



① When the power is turned ON or All reset button is pressed, the light path of the Pressure control sensor is checked.
② If no pulse is transmitted from the Encoder sensor within **100ms** after the Pressure control motor is turned ON, the machine assumes a Pressure control motor lock has occured and indicates the error code **[E 11]**.
③ If light path of the Pressure control sensor is not "blocked" or "opened" within **5 seconds** after the Pressure control motor is turned ON, the machine assumes a Pressure control motor lock has occured and indicates the error code **[E 11]**.



4. Pressure Regulation System <GR>

- Basic

The printing density is changed by turning ON the Pressure control motor.
The Pressure control motor changes the printing pressure by controlling the length of the Pressure springs.
The printing pressure, broken down into 10 levels, is determined by the print density setting, print speed setting and the temperature of ink (inside the drum).
The Pressure control sensor keeps track of the initial pressure position (home position).

- Pressure Regulation System

The pressure control motor rotates up or down to a specified position.
This motion is conveyed to the Print pressure adjustment screw via the Print pressure adjustment gear, changing the tension (pull power) of the Pressure spring, which changes the print pressure.
An encoder sensor is attached on top of the Pressure control motor to count the number of rotation the motor has made. (One motor rotation is converted into 5 pulse counts.)

- Initial Pressure Position (home position) -- Pressure Level No.5

The machine looks for the initial pressure position each time the main power is turned ON or All Reset button is pressed.
In this case, the Pressure control motor operates depending on the condition of the Pressure control sensor, as described below.

- **If the light path of the Pressure control sensor is open ;**
  The Pressure control motor rotates until the light path is blocked by the Bracket B, then rotates in the reverse direction until the light path is opened again.
- **If the light path of the pressure control sensor is blocked by the Bracket B;**
  The Pressure control motor rotates until the light path of the sensor is opened.

The initial (home) pressure position of the printing pressure is Level No.5.
Once the initial pressure position is achieved, the Pressure control motor rotates until the pressure level is adjusted to the equivalent of Print speed No.1. The printing starts from the low speed and is increased, changing the pressure at the same time, until a selected speed is achieved.

- At Speed-change Mode

When the Print speed button on the operation panel is pressed to change the printing speed, the pressure is increased as the speed is increased to keep the print density constant.

[Note] If the Print speed button is pressed while the machine is in idle, the Pressure control motor does not rotate until printing starts.

- At Density-change Mode (Not available for GR2710 and GR1700)

When the Print density button on the operation panel is pressed to change the print density, the pressure is increased as the density is increased.

[Note] If the Print density button is pressed while the machine is in idle, the Pressure control motor does not rotate until printing starts.

[For GR3750 ~ The Print speed is set at "3" for the Density-change mode with the BLACK Drum installed.]

In-drum Temperature \ Print Speed (Density) Setting			First Print (0 to 1 hour)	1	2	3	4	5
~10.0°C	(~50°F)	<~AB>	Level 10	Level 9	Level 10	Level 10	Level 10	Level 10
10.0~15.0°C	(50~59°F)	<AA~9C>	Level 9	Level 7	Level 9	Level 10	Level 10	Level 10
15.0~20.0°C	(59~68°F)	<9B~8D>	Level 6	Level 5	Level 7	Level 8	Level 9	Level 10
20.0~25.0°C	(68~77°F)	<8C~7E>	Level 3	Level 3	Level 5	Level 7	Level 8	Level 9
25.0~30.0°C	(77~86°F)	<7D~6F>	Level 3	Level 2	Level 4	Level 6	Level 7	Level 8
30.0°C~	(86°F~)	<6E~>	Level 2	Level 2	Level 3	Level 4	Level 5	Level 6

* "Level 1" corresponds to the lowest print pressure and "Level 10" the highest.
* The hexadecimal number in "< >" indicates a digital display of temperature in the drum which is displayed on the operation panel in Test mode No.115.

4. Pressure Regulation System <GR>

[Printing Pressure Setting Chart For GR3750]

In-drum Temperature	Speed-change Mode / Density-change Mode / For First Print (Period from the previous use)												
	- Speed 1	Density 1	Density 2	Speed 1	Speed 2	Speed 3	Speed 4	Speed 5					
	- Speed 2		Density 1	Density 3	Density 4	Density 5							
	- Speed 3			Density 2	Density 3	Density 4	Density 5						
	- Speed 4			Density 1	Density 2	Density 3	Density 4	Density 5					
	- Speed 5				Density 1	Density 2	Density 3	Density 4	Density 5				
						Density 1	Density 2	Density 3	Density 4	Density 5			
	0 ~ 1 HR	1 ~ 3 HR	Over 3 HR	Auto Idle									
~10.0°C (~50°F)	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 7 < 7 >	Level 8 < 8 >	Level 9 < 9 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >
10.0~15.0°C (50~59°F)	Level 9 < 9 >	Level 10 < 10 >	Level 10 < 10 >	Level 9 < 9 >	Level 5 < 5 >	Level 6 < 6 >	Level 7 < 7 >	Level 9 < 9 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >
15.0~20.0°C (59~68°F)	Level 6 < 6 >	Level 8 < 8 >	Level 9 < 9 >	Level 7 < 7 >	Level 3 < 4 >	Level 4 < 5 >	Level 5 < 6 >	Level 6 < 8 >	Level 7 < 9 >	Level 9 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >
20.0~25.0°C (68~77°F)	Level 3 < 3 >	Level 5 < 5 >	Level 8 < 8 >	Level 5 < 5 >	Level 1 < 2 >	Level 2 < 3 >	Level 3 < 4 >	Level 5 < 6 >	Level 7 < 8 >	Level 8 < 9 >	Level 9 < 10 >	Level 10 < 10 >	Level 10 < 10 >
25.0~30.0°C (77~86°F)	Level 3 < 3 >	Level 4 < 4 >	Level 7 < 7 >	Level 4 < 4 >	Level 1 < 1 >	Level 1 < 2 >	Level 2 < 3 >	Level 4 < 5 >	Level 6 < 7 >	Level 7 < 8 >	Level 8 < 9 >	Level 9 < 10 >	Level 10 < 10 >
30.0°C~ (86°F~)	Level 2 < 2 >	Level 4 < 4 >	Level 6 < 6 >	Level 3 < 3 >	Level 1 < 1 >	Level 1 < 2 >	Level 2 < 3 >	Level 3 < 4 >	Level 4 < 5 >	Level 5 < 6 >	Level 6 < 7 >	Level 7 < 8 >	Level 8 < 9 >

* The numbers in the brackets < > in the chart above indicate the print pressure settings when a color drum is installed.

[Printing Pressure Setting Chart For GR2750 & GR1750]

In-drum Temperature	Speed-change Mode / Density-change Mode / For First Print (Period from the previous use)												
	- Speed 1	Density 1	Density 2	Speed 1	Speed 2	Speed 3	Speed 4	Speed 5					
	- Speed 2		Density 1	Density 3	Density 4	Density 5							
	- Speed 3			Density 2	Density 3	Density 4	Density 5						
	- Speed 4			Density 1	Density 2	Density 3	Density 4	Density 5					
	- Speed 5				Density 1	Density 2	Density 3	Density 4	Density 5				
						Density 1	Density 2	Density 3	Density 4	Density 5			
	0 ~ 1 HR	1 ~ 3 HR	Over 3 HR	Auto Idle									
~10.0°C (~50°F)	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 7 < 8 >	Level 8 < 9 >	Level 9 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >
10.0~15.0°C (50~59°F)	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 5 < 6 >	Level 6 < 7 >	Level 7 < 8 >	Level 8 < 9 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >
15.0~20.0°C (59~68°F)	Level 8 < 8 >	Level 8 < 8 >	Level 10 < 10 >	Level 8 < 8 >	Level 3 < 4 >	Level 4 < 5 >	Level 5 < 6 >	Level 6 < 7 >	Level 8 < 9 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >
20.0~25.0°C (68~77°F)	Level 5 < 5 >	Level 6 < 6 >	Level 9 < 9 >	Level 4 < 4 >	Level 1 < 2 >	Level 2 < 3 >	Level 3 < 4 >	Level 5 < 6 >	Level 7 < 8 >	Level 9 < 9 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >
25.0~30.0°C (77~86°F)	Level 4 < 4 >	Level 5 < 6 >	Level 8 < 9 >	Level 4 < 4 >	Level 1 < 2 >	Level 1 < 3 >	Level 2 < 4 >	Level 4 < 5 >	Level 6 < 7 >	Level 8 < 9 >	Level 9 < 10 >	Level 10 < 10 >	Level 10 < 10 >
30.0°C~ (86°F~)	Level 3 < 4 >	Level 5 < 6 >	Level 7 < 8 >	Level 5 < 5 >	Level 1 < 1 >	Level 1 < 1 >	Level 2 < 2 >	Level 3 < 3 >	Level 5 < 5 >	Level 7 < 7 >	Level 8 < 8 >	Level 9 < 9 >	Level 10 < 10 >

* The numbers in the brackets < > in the chart above indicate the print pressure settings when a color drum is installed.

[Printing Pressure Setting Chart For GR2710 & GR1700]

In-drum Temperature	For First Print (Period from the previous use)				Speed-change Mode	Speed 1	Speed 2	Speed 3	Speed 4	Speed 5
	0 ~ 1 HR	1 ~ 3 HR	Over 3 HR	Auto Idle						
~10.0°C (~50°F)	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >		Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >
10.0~15.0°C (50~59°F)	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >		Level 9 < 9 >	Level 9 < 9 >	Level 10 < 10 >	Level 10 < 10 >	Level 10 < 10 >
15.0~20.0°C (59~68°F)	Level 9 < 9 >	Level 9 < 9 >	Level 10 < 10 >	Level 9 < 9 >		Level 6 < 7 >	Level 7 < 8 >	Level 8 < 9 >	Level 9 < 10 >	Level 10 < 10 >
20.0~25.0°C (68~77°F)	Level 6 < 7 >	Level 7 < 8 >	Level 9 < 9 >	Level 6 < 7 >		Level 4 < 6 >	Level 5 < 7 >	Level 7 < 8 >	Level 8 < 9 >	Level 9 < 10 >
25.0~30.0°C (77~86°F)	Level 5 < 5 >	Level 6 < 7 >	Level 9 < 9 >	Level 5 < 6 >		Level 2 < 4 >	Level 3 < 5 >	Level 6 < 6 >	Level 7 < 7 >	Level 8 < 8 >
30.0°C~ (86°F~)	Level 2 < 3 >	Level 4 < 5 >	Level 7 < 8 >	Level 5 < 6 >		Level 1 < 3 >	Level 2 < 4 >	Level 4 < 5 >	Level 6 < 6 >	Level 7 < 7 >

* The numbers in the brackets < > in the chart to the left indicate the print pressure settings when a color drum is installed.

2. Press/Rotation Section

[Removal and Assembly]

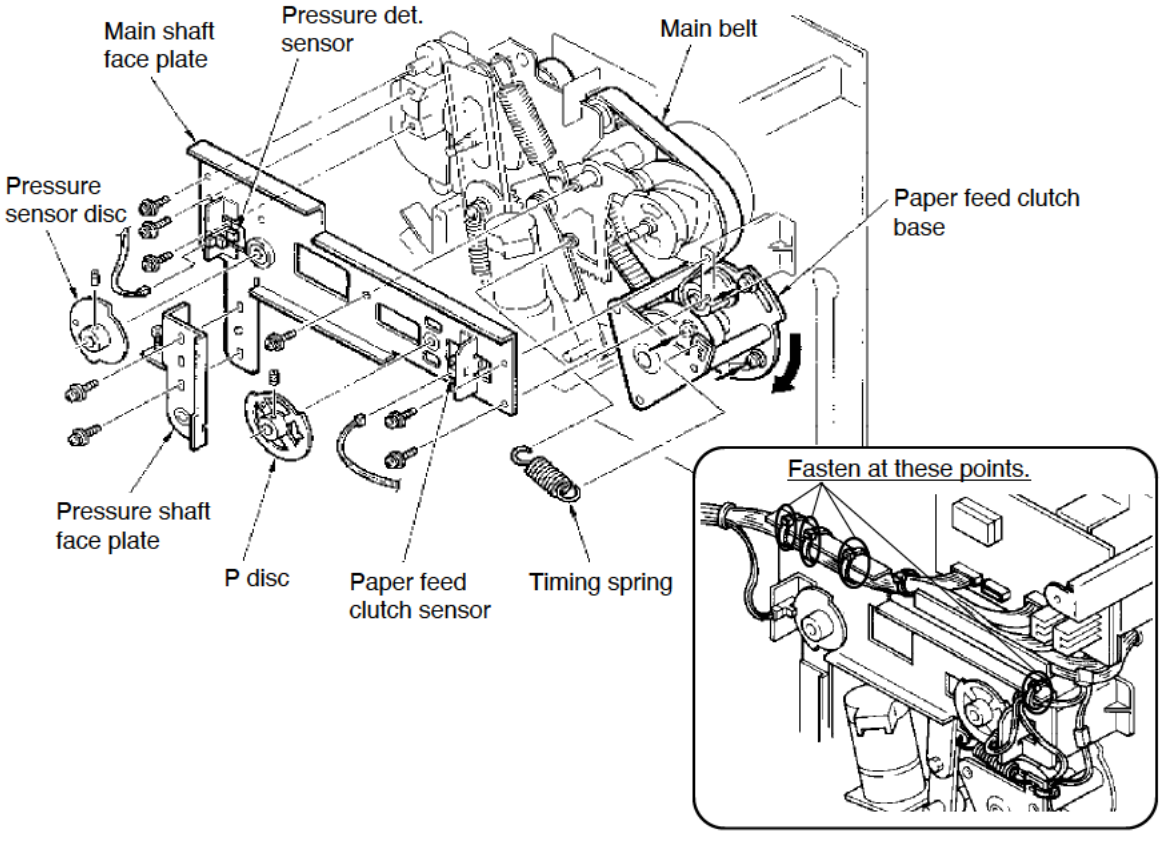
1. Main Shaft Face Plate

< Removal Procedure >

1. Open the Front cover and press the Drum home position button to set the Drum at the home position (Position A).
   Turn OFF the power and remove the Back cover.
2. Remove the Timing spring.
3. Loosen three mounting screws on the Paper feed clutch base and turn the Paper feed clutch unit clockwise to release the tension of the Main belt.
4. Loosen the allen screws securing the P disc and Pressure sensor disc and remove these discs.
5. Remove two mounting screws on the Pressure shaft face plate and remove the plate.
6. Disconnect the connectors of the Paper feed clutch sensor and Pressure detection sensor, and cut the wire clampers fastening the wire harnesses on the Main shaft face plate.
7. Remove six mounting screws on the Main shaft face plate and remove the plate.

- Precautions In Assembly -

- After securing the Main shaft face plate, always check if the Drum can be smoothly pulled out of and pushed into the machine.
  If not, loosen the mounting screws on the Main shaft face plate and change the position of the plate to obtain the correct position of the Main shaft.
- Fasten the wire harnesses on the Main shaft face plate with wire clampers as shown below.
- Perform the following adjustments after assembly: resting position of pressure lever (cf. p. II-18), position of P disc (cf. p. I-30) and position of pressure sensor disc (cf. p. II-21)



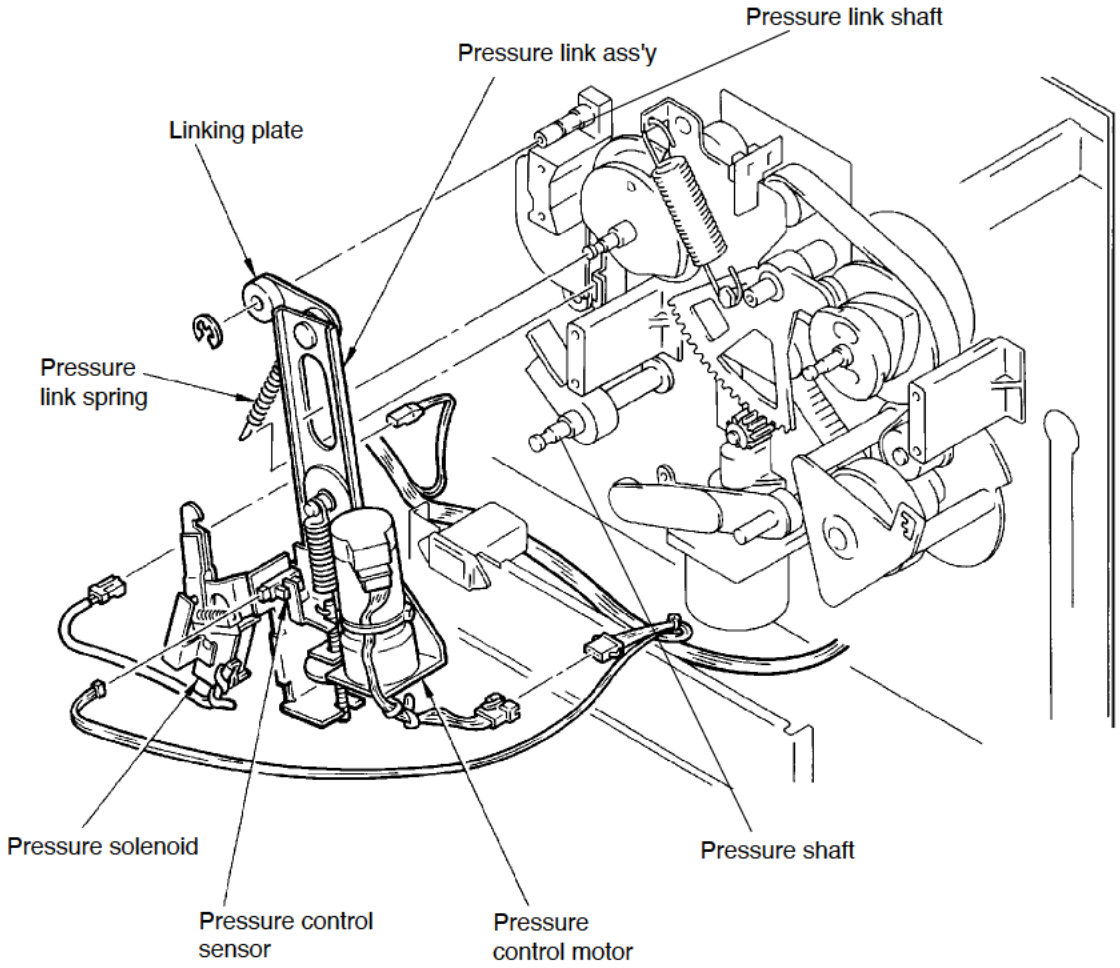
2. Pressure Link Ass'y

< Removal Procedure >

1. Remove the Main shaft face plate, referring to the previous page.
2. Disconnect the connectors of the following parts: Pressure control motor, Pressure control sensor and Pressure solenoid
3. Unhook the Pressure link spring at the lower point.
4. Remove an E ring on the Linking plate shaft and then remove the Pressure link ass'y (which includes the Pressure hook), sliding the Linking plate and the Pressure hook off the respective shafts.
   [IMPORTANT]
   Never force the Pressure link ass'y off the Drive base unit to avoid deformation of the Pressure links. If they are deformed, they will not smoothly move up and down after assembly.

- Precautions In Assembly -

- Never install the Pressure link ass'y forcibly into the Drive base unit to avoid deformation of the Pressure links. If they are deformed, they will not smoothly move up and down after assembly.
- After assembly, check the following adjustments: position of Pressure solenoid (cf. p. II-19), resting position of Hook lever (cf. p. II-20) and standard pressure position (cf. p. II-15)



3. Pressure Lever

< Removal Procedure >

1. Remove the Pressure link ass'y, referring to the previous page.
2. Unhook the Pressure lever spring at the upper point.
3. Loosen two allen screws securing the Pressure lever and then remove the Pressure lever, sliding it off the Pressure shaft.

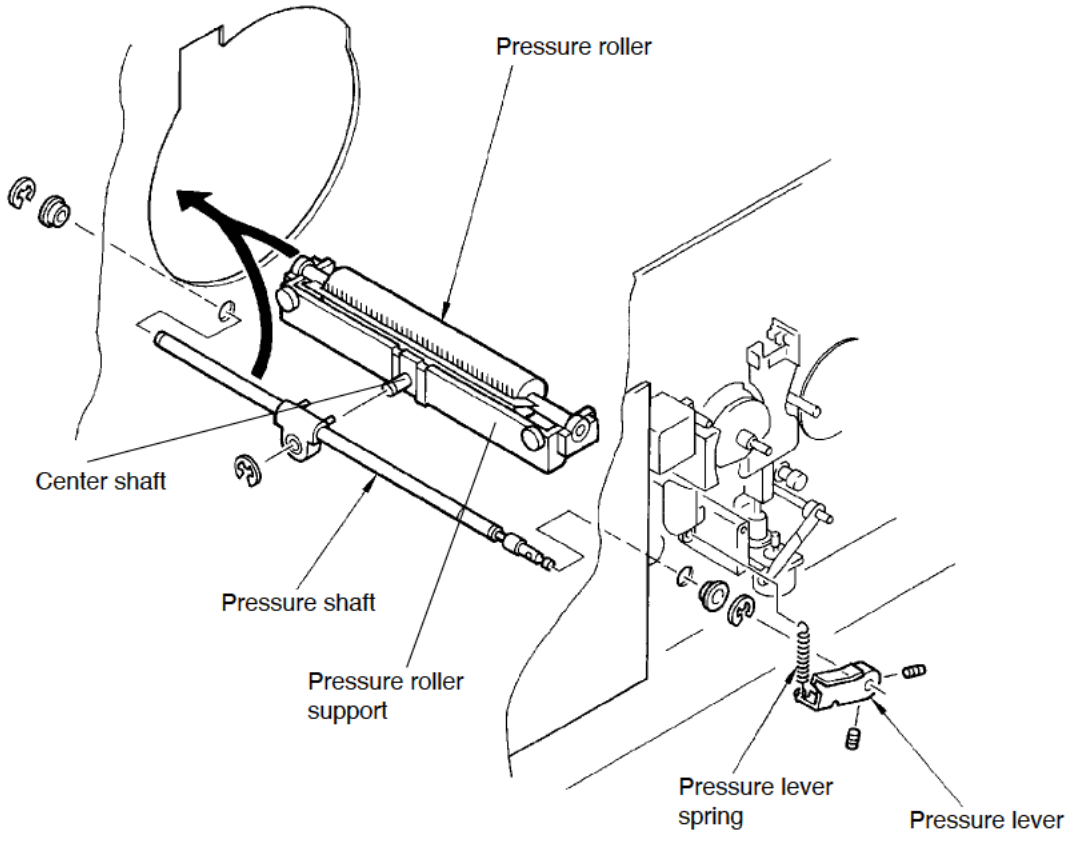
- Precautions In Assembly -

- Always adjust the installation position of the Pressure lever after assembly. (Refer to p. II-16.)

4. Pressure Shaft

< Removal Procedure >

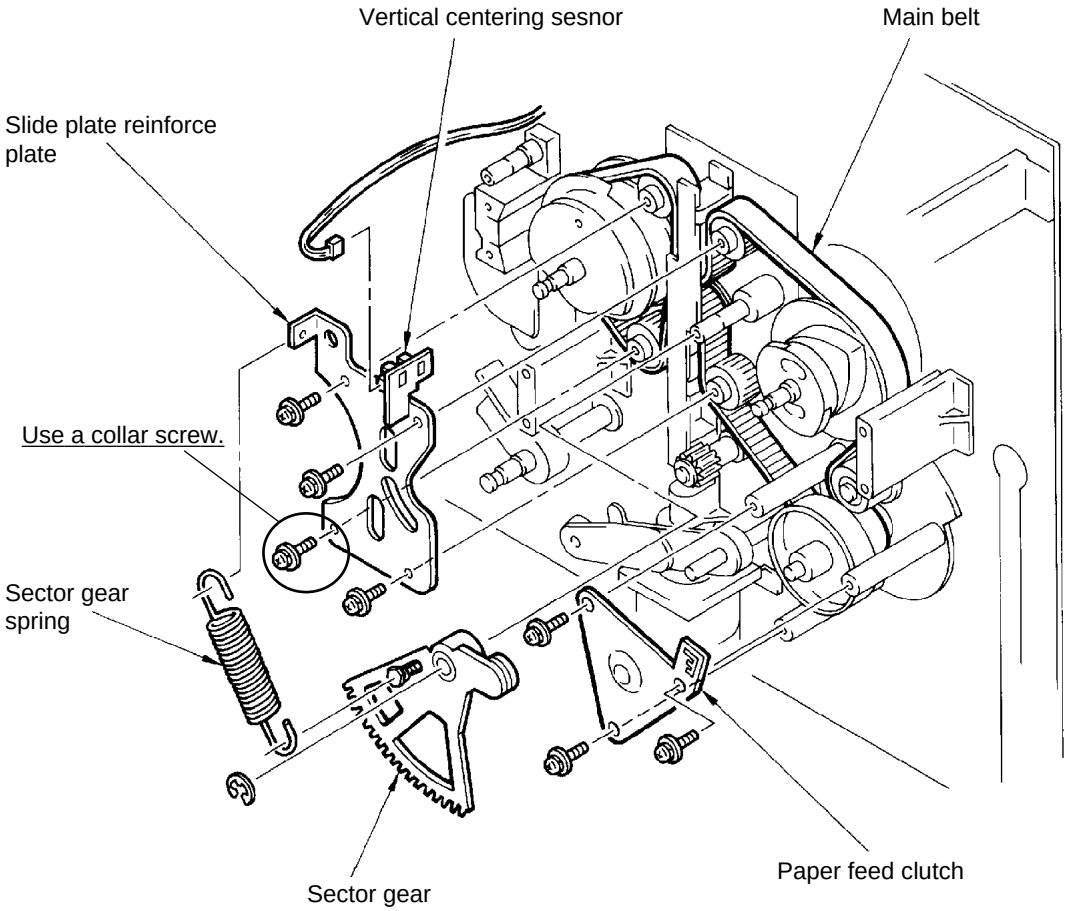
1. Remove the Pressure lever, referring above.
2. Take out the Drum from the machine.
3. Remove the Paper receiving tray and Suction cover plate, referring to the page III-8.
4. Remove the mounting screws on the Suction unit and pull out the unit a little to make space for removal of the Pressure shaft.
5. Remove E rings and collars at both ends of the Pressure shaft, and then take out the shaft from the opening for the Drum installation.
6. Remove an E ring on the Center shaft of the Pressure roller support and separate the Pressure roller support from the Pressure shaft.



5. Main Belt

< Removal Procedure >

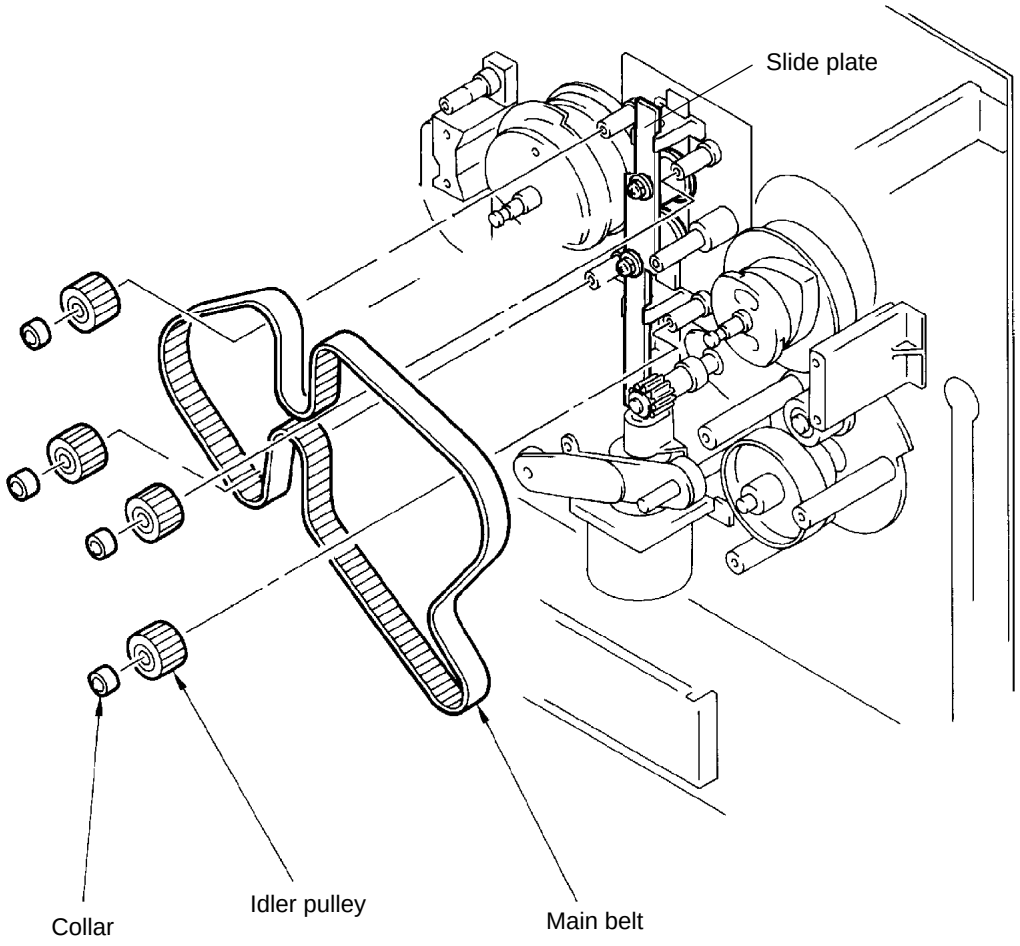
1. Remove the Pressure link ass'y, referring to the page II-8.
2. Remove the Sector gear spring.
3. Remove an E ring on the Sector gear shaft and then remove the Sector gear.
4. Remove three mounting screws on the Paper feed clutch and then remove the clutch.
5. Disconnect the connector of the Vertical centering sensor.
6. Remove four mounting screws on the Slide plate reinforce plate and then remove the plate and the Vertical centering sensor together.



7. Remove four Idler pulleys and collars from the shafts.
8. Remove the Main belt, leading it through behind the Slide plate.
   [IMPORTANT]
   Be careful not to lose collars on the Idle pulleys and spacers on the Idlers by dropping them when removing the belt.

- Precautions in Assembly -

- When securing the Slide plate reinforce plate, always use a collar screw for the lower left mounting screw because a double-washer screw will hit the Sector gear.
- After assembly, perform the following adjustments: resting position of Pressure lever (cf. p. II-18), position of P disc (cf. p. I-30), position of Pressure sensor disc (cf. p. II-21) and vertical print position (cf. p. I-34)



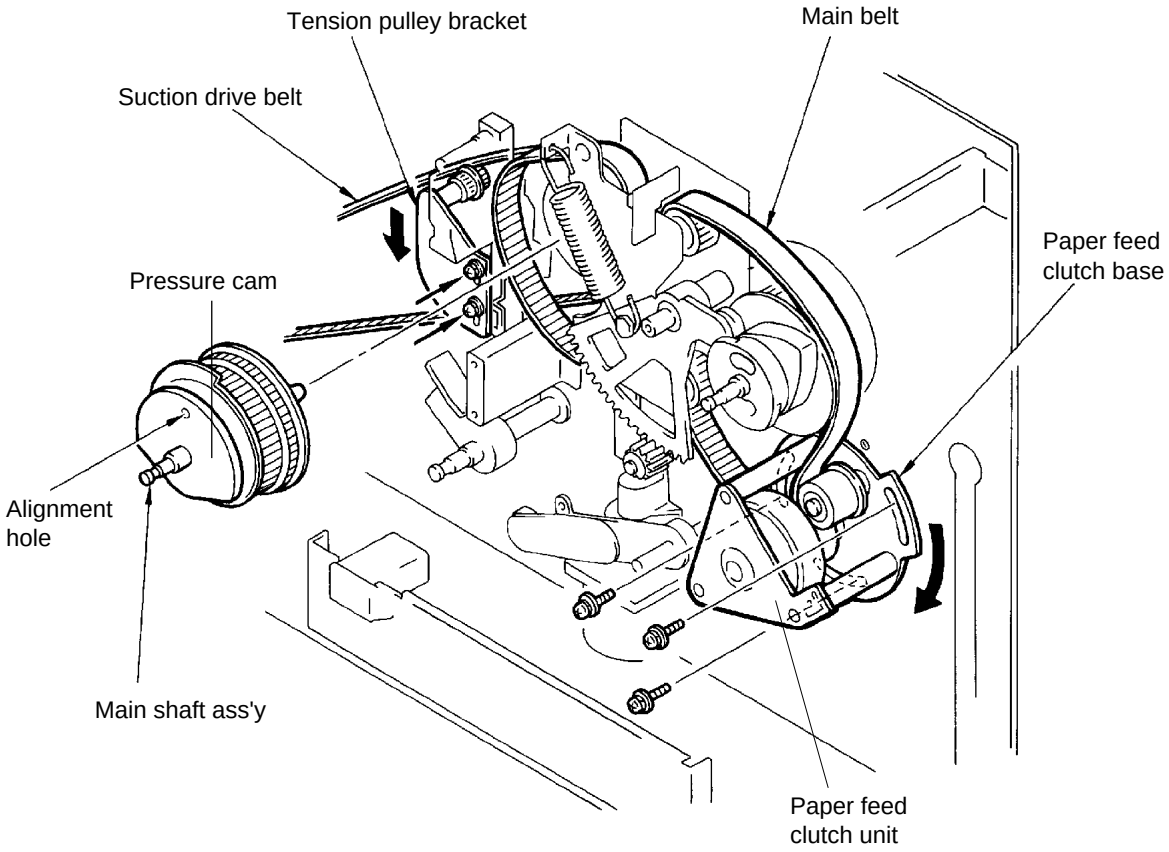
6. Main Shaft Ass'y

< Removal Procedure >

1. Take out the Drum from the machine.
2. Remove the Pressure link ass'y, referring to the page II-8.
3. Remove three mounting screws on the Paper feed clutch base and let the Paper feed clutch unit hang free to loosen the tension of the Main belt further.
4. Loosen two mounting screws on the Tension pulley bracket and loosen the tension of the Suction drive belt.
5. Remove the belts from the Main pulley and then remove the Main shaft ass'y.

- Precautions in Assembly -

- Install the Main shaft ass'y so that the alignment hole on the Pressure cam can point up.
- Secure the Tension pulley bracket pushing it upward to apply tension to the Suction drive belt.
- Adjust the vertical print position after assembly. (Refer to the page I-34.)



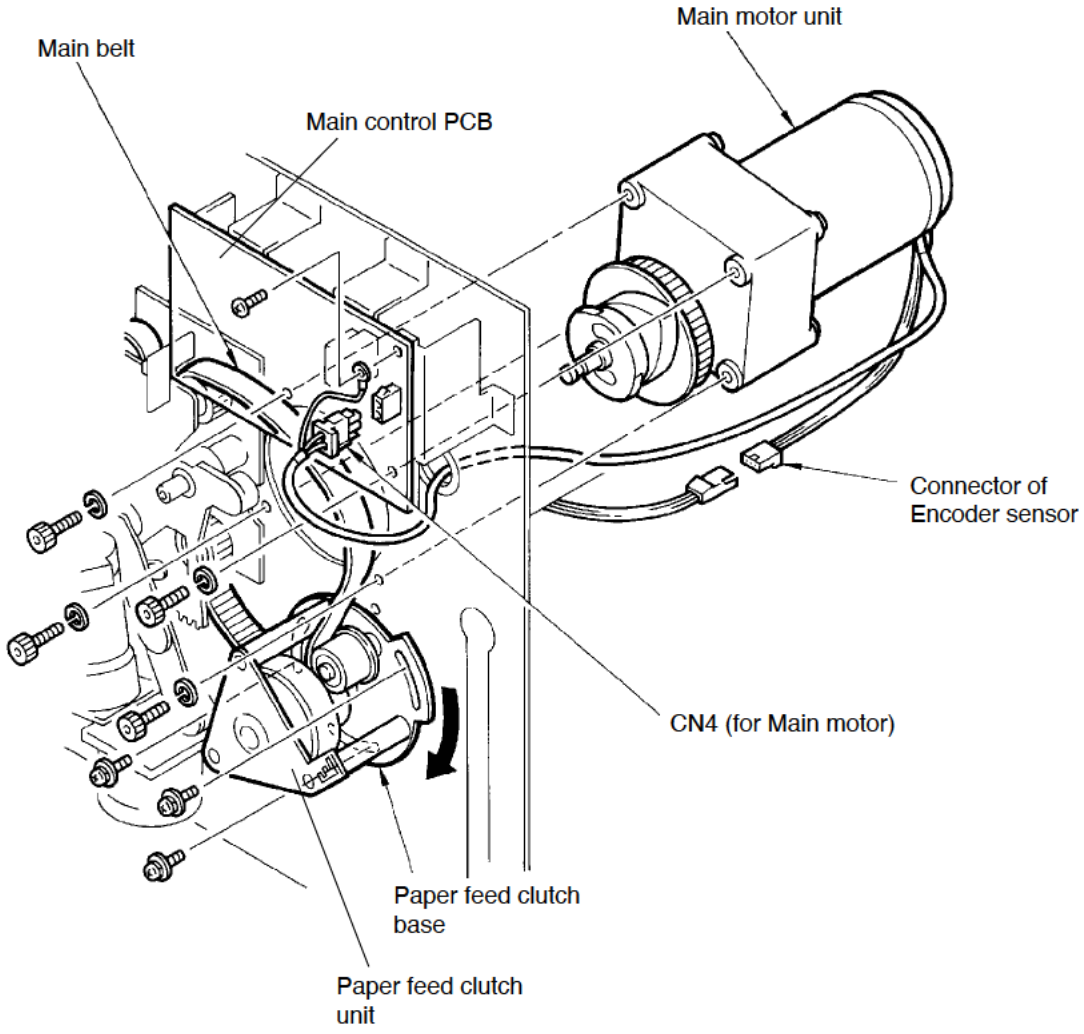
7. Main Motor Unit

< Removal Procedure >

1. Remove the Master removal unit, referring to the page VIII-5.
2. Remove the Main shaft face plate, referring to the page II-7.
3. Remove three mounting screws on the Paper feed clutch base and let the Paper feed clutch unit hang free to loosen the tension of the Main belt further.
4. Disconnect the connector **CN4** (for the Main motor) on the **Motor control PCB** and remove the ground wire coming out of the wire harness of the connector CN4 from the Motor control PCB.
5. Disconnect the connector of the Encoder sesnor attached to the Main motor unit.
6. Remove four mounting screws of the Main motor unit and take out the Main motor unit from under the Master removal unit.

- Precautions In Assembly -

- Install the Main motor unit so that the Cam pulley can be positioned blow the half of the Main motor's height.
- After assembly, perform the following adjustments: resting position of Pressure lever (cf. p. II-18) and vertical print position (cf. p. I-34)



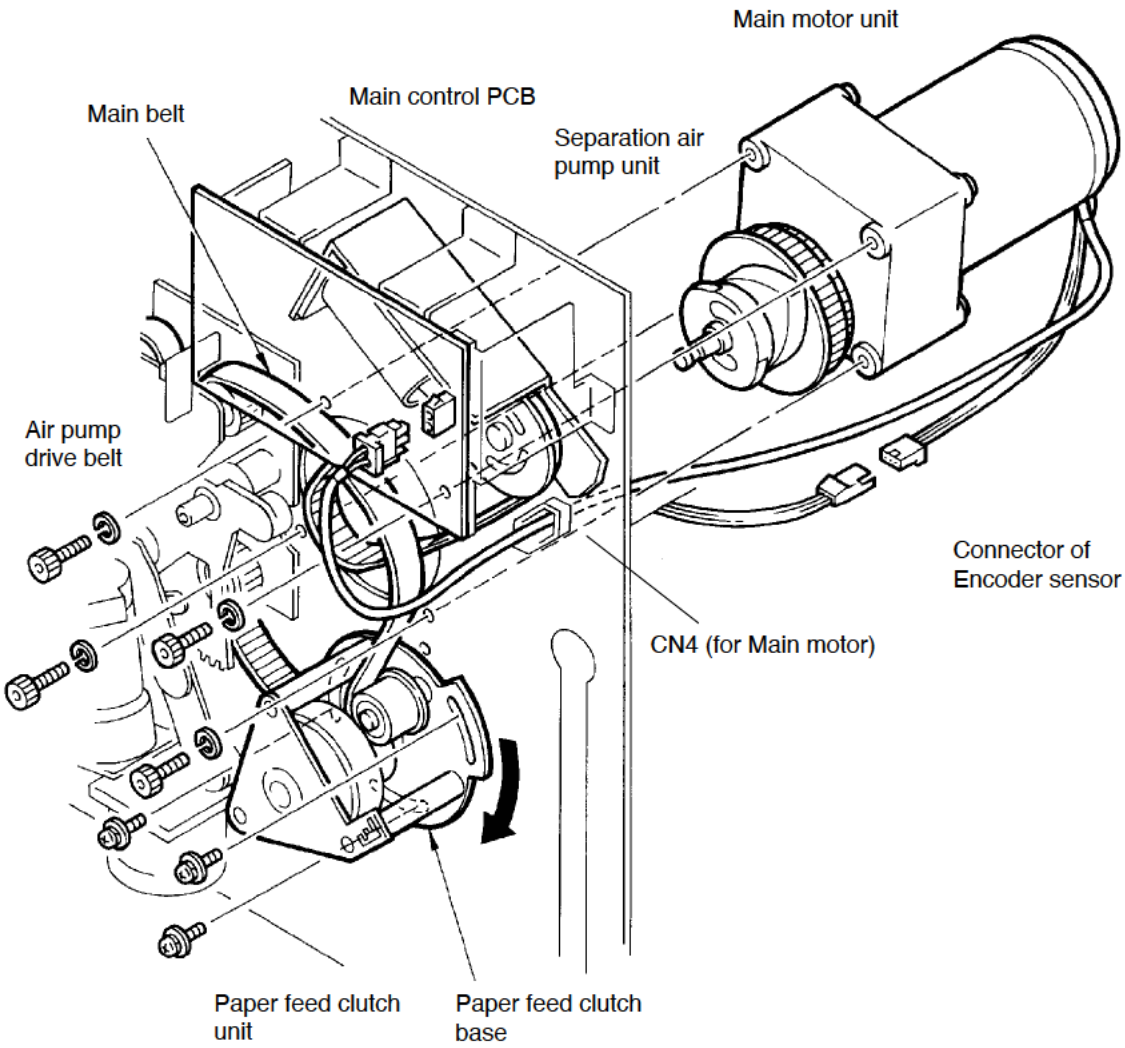
8. Main Motor Unit <GR>

< Removal Procedure >

1. Remove the Master removal unit, referring to the pages VIII-11-GR36 and VIII-11-GR37.
2. Remove the Main shaft face plate, referring to the page II-7.
3. Remove three mounting screws on the Paper feed clutch base and let the Paper feed clutch unit hang free to loosen the tension of the Main belt further.
4. Disconnect the connector **CN4** (for the Main motor) on the **Motor control PCB**.
5. Disconnect the connector of the Encoder sesnor attached to the Main motor unit.
6. Remove four mounting screws of the Main motor unit.
7. Disengage the Main belt and Air pump drive belt from the pulleys attached to the Main motor unit and take out the unit from inside the body.

- Precautions In Assembly -

- Install the Main motor unit so that the Cam pulley can be positioned blow the half of the Main motor's height.
- After assembly, perform the following adjustments: resting position of Pressure lever (cf. p. II-18) and vertical print position (cf. p. I-34)



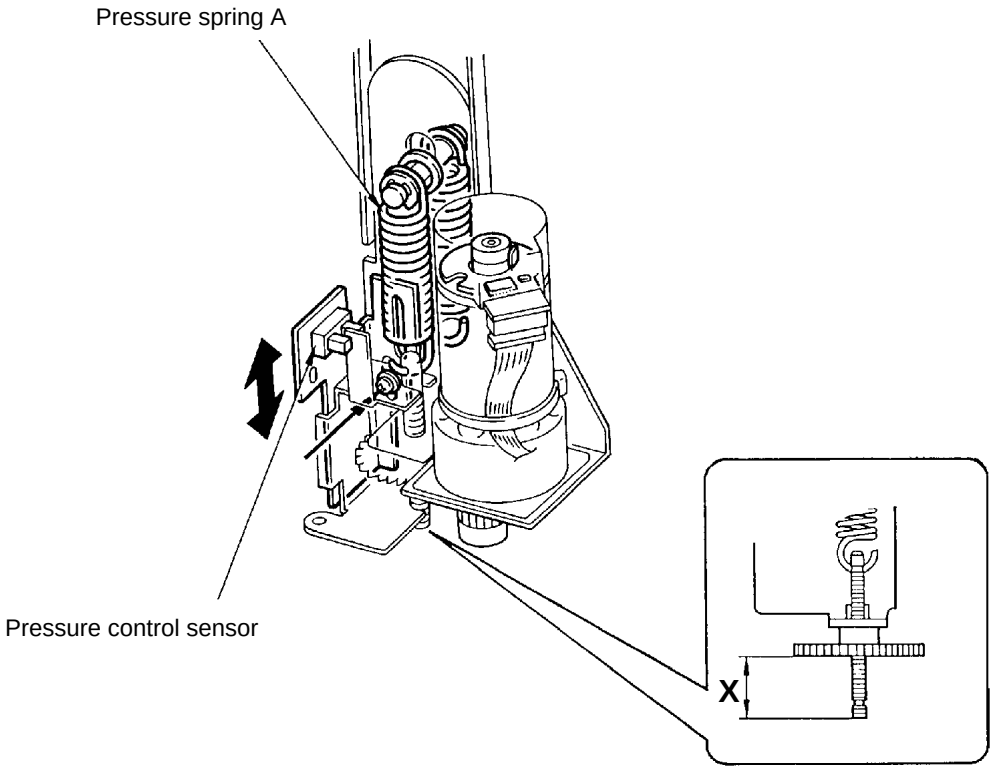
2. Press/Rotation Section

[Adjustment]

1. Standard Pressure Position

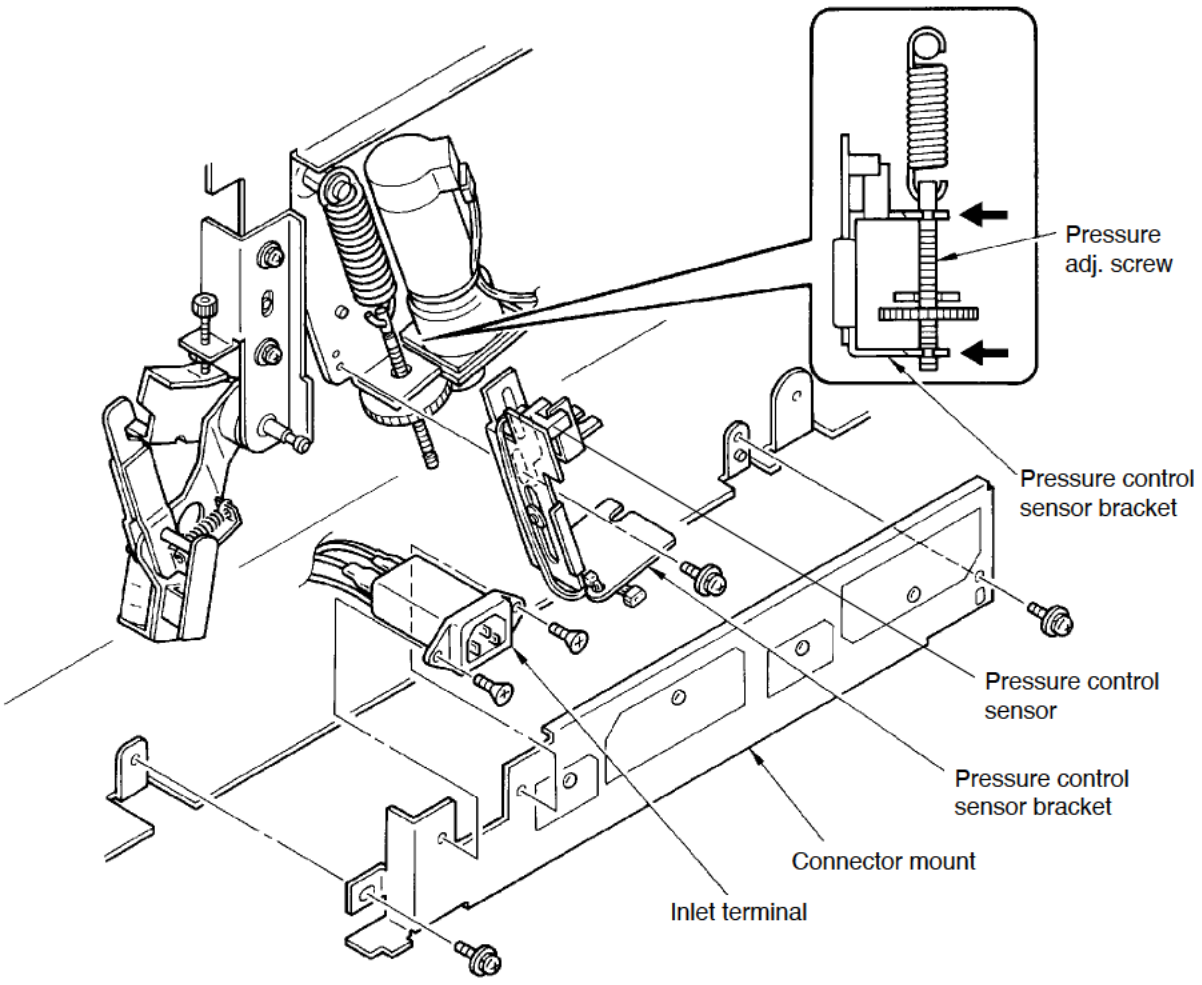
1. Remove the Back cover.
2. Select test mode **No.114** and let the movement repeat 3 times.
   The Pressure control motor stops automatically at pressure level No.7
3. Turn **OFF** the power.
4. Measure the **[X]**, i.e. length of from the end of the Print pressure adjustment screw to the bottom face of the Print pressure adjustment gear.
5. The measurement should equal to the value on the chart at the right.
6. If not, remove the Pressure control motor and unplug the connector.
7. Turn the Print pressure adjustment gear manually until the measurement **[X]** is adjusted to the chart.
8. Turn **ON** the power switch.
9. Loosen the mounting screw of the Pressure control sensor bracket, as indicated by an arrow on the sketch, and lower the bracket all the way down.
10. Looking at the **LED (PRP)**, which is located at the right end of the bottom line of LEDs on the System PCB, gradually lift the sensor bracket until the LED is turned ON.
11. Tighten the mounting screw of the sensor bracket in that position.
12. Turn **OFF** the power switch.
13. Mount the Pressure control motor and plug the connector.

Drum Type	Standard Value
Legal / A4	X = 17 mm
B4	X = 20 mm



2. Installation Position of Pressure Lever

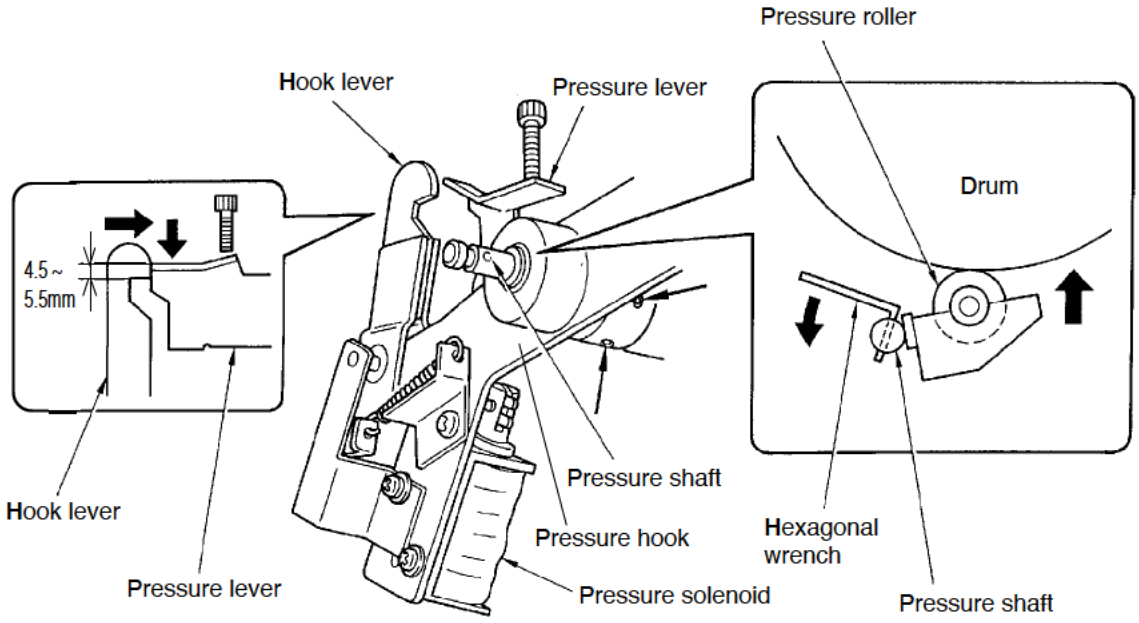
1. Put a blank master on the Drum by selecting confidential master making.
2. Remove the Back cover and set the Drum at the home position (Position A).
   Turn OFF the power.
3. Insert a bar into the hole on the end of the Pressure shaft and turn the shaft counter-clockwise with the bar to press the Pressure roller closely against the Drum.
   Keeping the Pressure shaft in this condition and pushing the Hook lever against the Pressure lever as shown in the figure on the next page, check if the distance from the top edge of the angular hole of the Hook lever to the top face of the bent part of the Pressure lever is **4.5 to 5.5mm**.
4. If not, adjust the installation position of the Pressure lever as follows.
   1) Remove two mounting screws on the Inlet terminal and let it free.
   2) Remove two mounting screws on the Connector mount and then remove it.
   3) Disconnect the connector of the Pressure control sesnor.
      Remove the securing screw on the Pressure control sesnor bracket and then remove the bracket.



4) Loosen the allen screws that secure the Pressure lever on the Pressure shaft.
5) Push down the Pressure lever and hold it at the position where the distance from the top edge of the angular hole of the Hook lever to the top face of the bent part of the Pressure lever is **4.5 to 5.5mm** when measured with the Hook lever pushed against the Pressure lever.
[IMPORTANT]
Hold the Pressure lever pressing it against the Pressure hook.
6) Insert a bar (a hexagonal wrench) into the hole on the end of the Pressure shaft, and turn the shaft counter-clockwise with the bar to press the Pressure roller closely against the Drum.
7) Keeping the Pressure lever and Pressure shaft in the conditions described above, tighten the allen screws to secure the Pressure lever on the Pressure shaft.

- Results of MIsadjustment -

- If the Pressure lever is installed too low (the distance is **much less than 4.5mm**); the pressure of the Pressure roller will be too weak against the Drum, which causes printed copies to be light.
Or the Pressure roller will not contact the Drum with enough pressure to transport a sheet through the print section, causing paper jam.
- If the Pressure lever is installed too high (the distance is **much more than 5.5mm**); the pressure of the Pressure roller will be too high against the Drum, which causes much stress on the Pressure links and Drum body and shortens their life.

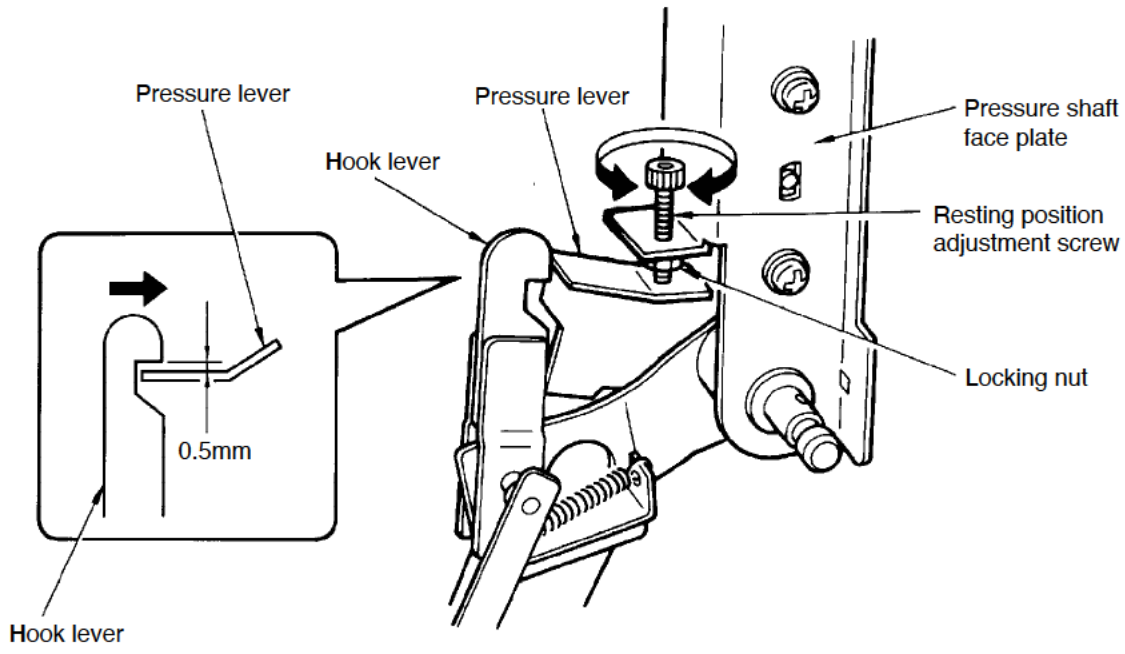


3. Resting Position of Pressure Lever (Pressure Roller)

1. Remove the Back cover.
2. Rotate the Drum by pressing **SW1** on the **System PCB** until the Hook lever comes up to the highest position.
   Turn OFF the power.
3. Push the Hook lever to the right and check if the distance from the top edge of the angular hole of the Hook lever to the top face of the bent part of the Pressure lever measures **0.5mm**.
4. If not, adjust the resting position of the Pressure roller as follows.
   1) Loosen the locking nut on the Resting position adjustment screw located on the Pressure shaft face plate.
   2) Turn the adjustment screw until the correct value is obtained.
   3) Tighten the locking nut to secure the adjustment screw.

- Results of MIsadjustment -

- If the bent part of the Pressure lever is rested higher than the top edge of the angular hole of the Hook lever (the Pressure roller is rested too low);
  the Hook lever will not engage with the Pressure lever when the Pressure solenoid is activated ON, preventing the Pressure roller from lifting up to the Drum, which causes paper jam under the Drum.
- If the bent part of the Pressure lever is rested on the same level of the top edge of the angular hole of the Hook lever (the Pressure roller is rested a little too low);
  the Hook lever will not disengage from the Pressure lever when the Pressure solenoid is deactivated, keeping the Pressure roller pressed against the Drum without a sheet of paper between, which smudges the Pressure roller with ink and blocks the re-installation of the pulled-out Drum.
- If the bent part of the Pressure lever is rested much lower (**much more than 0.5mm**) than the top edge of the angular hole of the Hook lever (the Pressure roller is rested too high);
  the Pressure roller will contact the Clamp section on the Drum, which can damage the Clamp section and/or the Pressure roller.



4. Position of Pressure Solenoid

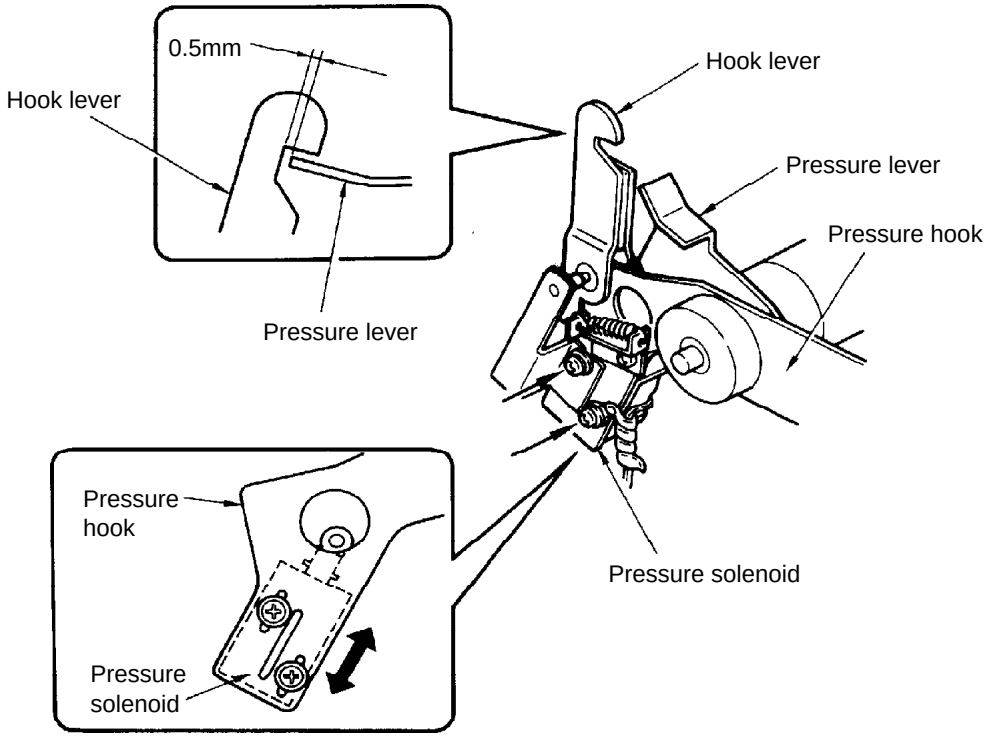
1. Remove the Back cover.
2. Rotate the Drum by pressing **SW1** on the **System PCB** until the Hook lever comes up to the highest position.
3. Start up Test mode **No.68** to activate the Pressure solenoid and engage the Hook lever with the Pressure lever.
4. Check if the gap between the deepest point of the angular hole of the Hook lever and the edge of the bent part of the Pressure lever measures **0.5mm**.
5. If not, adjust the position of the Pressure solenoid as follows.
   1) Loosen two mounting screws of the Pressure solenoid attached on the Pressure hook.
   2) Move up or down the Pressure solenoid.
   3) Tighten the mounting screws to secure the Pressure solenoid and check the gap.
   4) Repeat the procedures in the steps 1) to 3) above until the gap measures 0.5mm.

- Precautions in Adjustment -

- Perform printing at the highest and lowest speeds and confirm that the Hook lever closely engages with the Pressure lever during printing.

- Results of Misadjustment -

- If the Hook lever engages with the Pressure lever too shallow (the gap is **much more than 0.5mm**);
  the Hook lever will slip off the Pressure lever, preventing the Pressure roller from lifting up to the Drum, which causes paper jam under the Drum.
  This condition may eventually cause damages to the Hook lever and Pressure lever.
- If the Hook lever engages with the Pressure lever too deep (the gap is **none** and the Pressure solenoid is positioned too low);
  the plunger of the Pressure solenoid will not be pulled in when the solenoid is activated ON, preventing the Pressure roller from lifting up to the Drum, which causes paper jam under the Drum.



5. Resting Position of Hook Lever

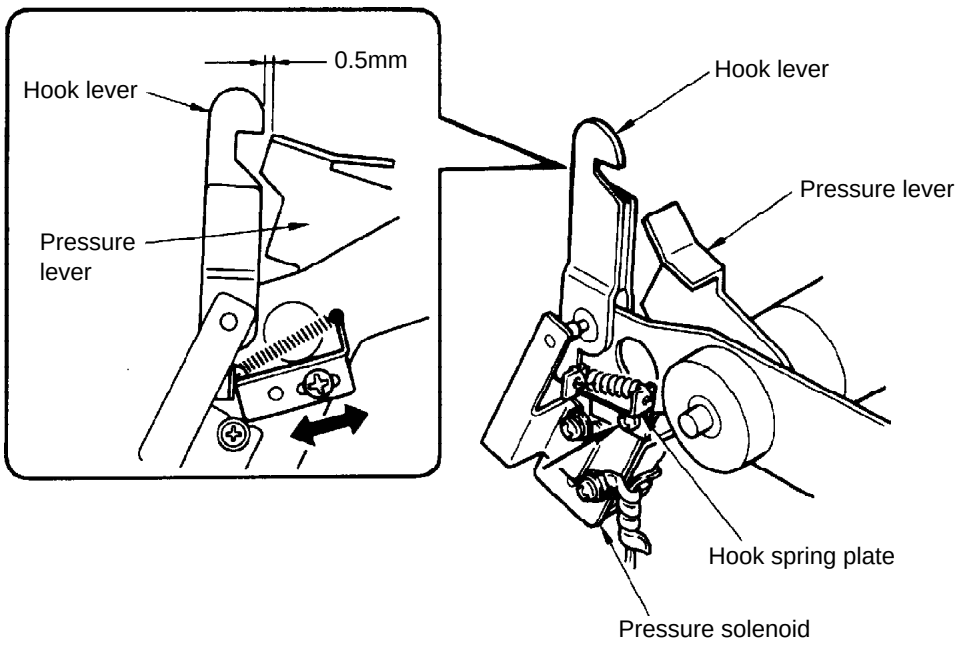
1. Remove the Back cover.
2. Rotate the Drum by pressing **SW1** on the **System PCB** until the top edge of the angular hole of the Hook lever is on a level with the top face of the bent part of the Pressure lever.
   Turn OFF the power.
3. Check if the minimum gap between the Hook lever and the edge of the bent part of the Pressure lever measures **0.5mm**.
5. If not, adjust the resting position of the Hook lever as follows.
   1) Loosen the mounting screw on the Hook spring plate attached on the Pressure hook.
   2) Move the Hook spring plate to the left or right to adjust the gap to 0.5mm.
   3) Tighten the mounting screw to secure the Hook spring plate.

- Precautions in Adjustment -

- Match a boss on the Pressure hook with a hole on the Hook spring plate when securing the plate.
- Perform printing at the highest and lowest speeds and confirm that the Hook lever closely engages with the Pressure lever during printing.

- Results of Misadjustment -

- If the gap is too narrow **(much less than 0.5mm**);
  the Hook lever will catch the Pressure lever when the Pressure solenoid is not activated ON, keeping the Pressure roller pressed against the Drum without a sheet of paper between, which smudges the Pressure roller with ink and blocks the installation of the pulled-out Drum.
- If the gap is too wide **(much more than 0.5mm**);
  the Hook lever will not engage with the Pressure lever when the Pressure solenoid is activated ON, preventing the Pressure roller from lifting up to the Drum, which causes paper jam under the Drum.



6. Position of Pressure Sensor Disc

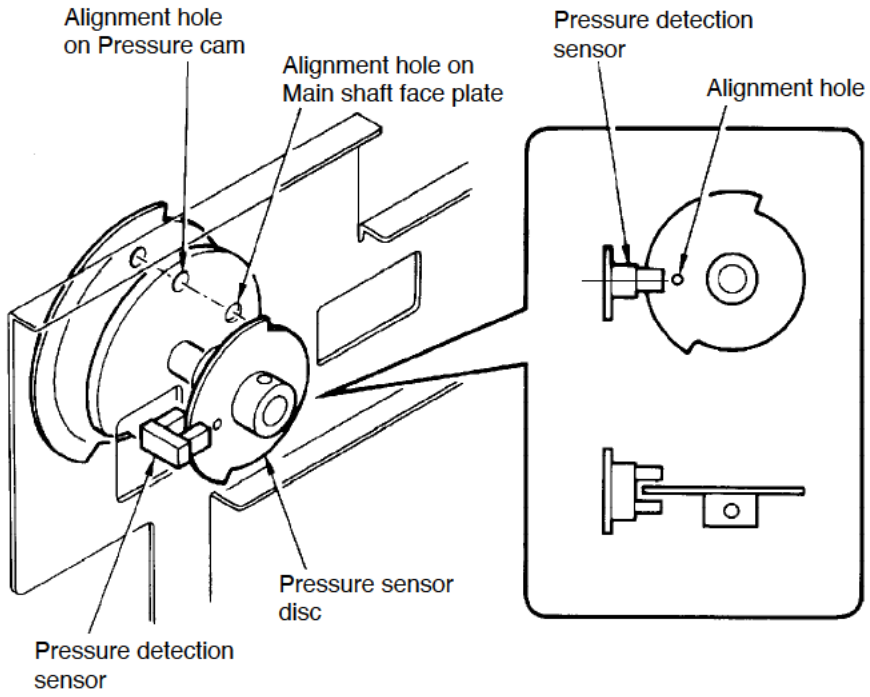
1. Remove the Back cover.
2. Set the Drum at the home position (Position A).
   Turn OFF the power.
3. Check if the alignment hole on the Pressure sensor disc is positioned on a level with the center of the Pressure detection sensor as shown in the figure below.
4. If not, first check if the hole on the Main shaft face plate is aligned with the counterpart on the Pressure cam
   If it is not aligned, adjust the arrangement of the Pressure cam, referring to the page I-35.
5. If the alignment hole on the Pressure sensor disc is still not correctly positioned after confirming the hole alignment for the Pressure cam, loosen the allen screw securing the Pressure sensor disc and turn the Pressure sensor disc so that the alignment hole is positioned on a level with the center of the Pressure detection sensor.
6. Tighten the allen screw inside the Pressure sensor disc.
   [IMPORTANT]
   Secure the Pressure sensor disc so that it is positioned in the middle of the Pressure detection sensor as shown in the figure below.

- Precautions In Adjustment -

- Make sure that the Pressure sensor disc doesn't get contact with the inner surface of the Pressure detection sensor at any position by rotating the Pressure sensor disc with a press of SW1 on the System PCB.

- Results of Misadjustment -

- If the Pressure sensor disc is incorrectly positioned;
  the paper path through the Paper receiving sensor 1 will be checked out of time, which misleads the machine to assume that a printed sheet has jammed in the paper ejection section when no sheet actually jamms there.
  As a result, the error code **[E 32]** will be displayed on the operation panel.

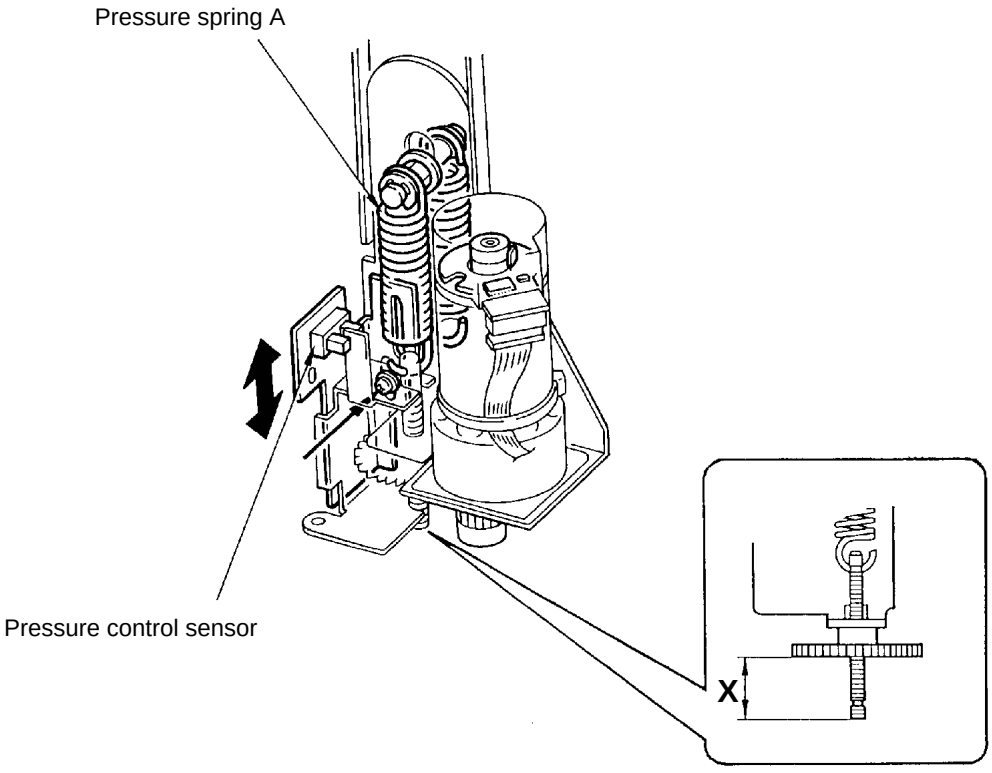


7. Standard Pressure Position <GR>

1. Pull out the Drum and Remove the Back cover.
2. Turn ON the power.
   The Print pressure is automatically set at the **level 5** (the initial position).
3. Turn OFF the power.
4. Measure the **[X]**, i.e. length from the end of the Print pressure adjustment screw to the bottom face of the Print pressure adjustment gear.
5. The measurement should equal to the value on the chart to the right.
6. If not, loosen the mounting screw of the Pressure control sensor bracket, as indicated by an arrow in the sketch below, and adjust the position.
7. Turn ON the power again and measure the **[X]** to confirm that the correct value as indicated in the chart is given.

Drum Type	Standard Value
Legal / A4	X = 18.0 mm
B4	X = 19.0 mm
Ledger / A3	X = 18.5 mm

IMPORTANT:
The Drum must be pulled out.
Pulling the Drum out has the same effect as using Test mode **No.114** to bypass the temperature reading by the Drum. (ref: Page II-15 of RA Technical Manual)



3. Paper Ejection Section

[Theory of Operation]

1. Paper Ejection System

- Separation of Paper
A printed sheet is separated from the Drum by the Separator and Separation fan.

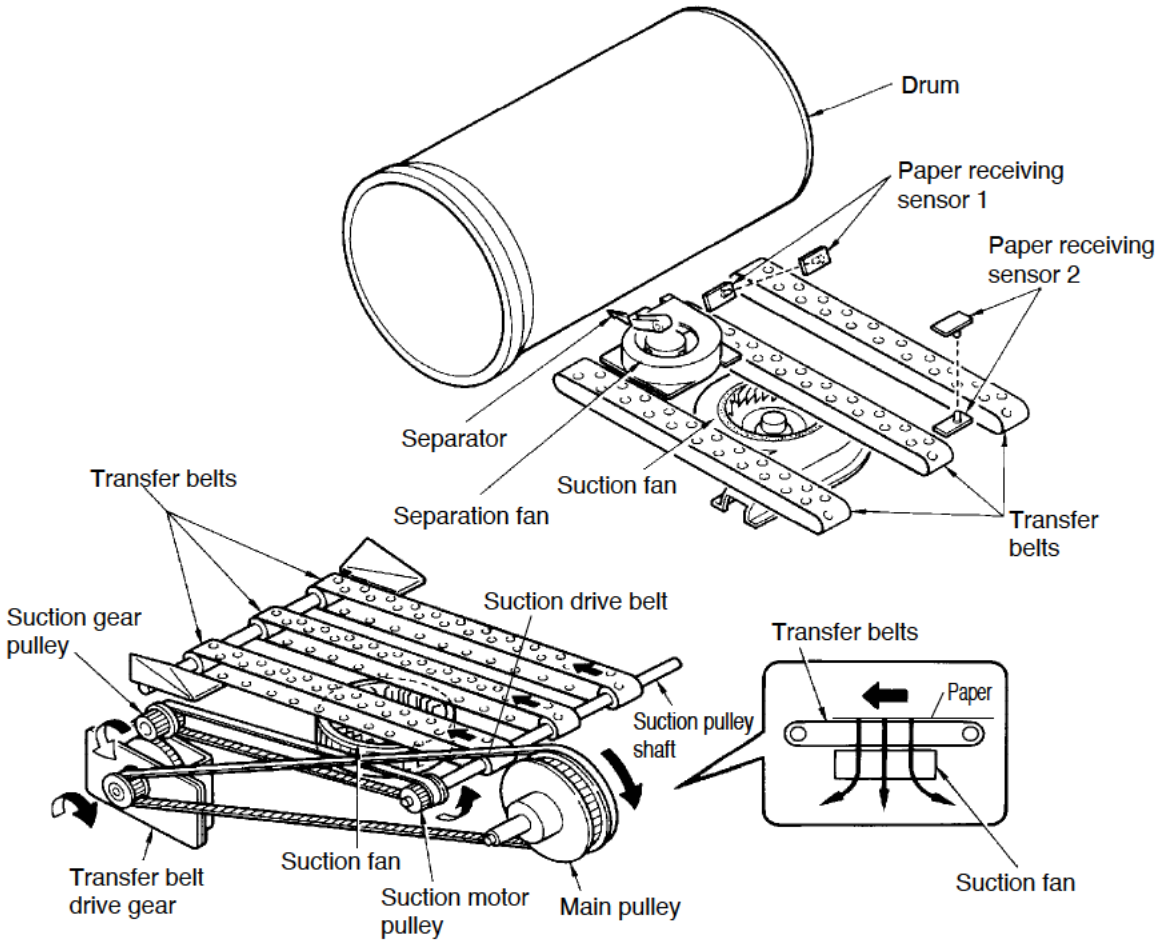
- Function of Separation Fan
During printing, the Separation fan blows air to the lead edge of a printed sheet on the Drum from above the Separator.
This air blow assists the Separator to separate the printed sheet from the Drum.

- Paper Transfer
Once a printed sheet is separated from the Drum, it is transported to the Paper receiving tray by the Transfer belts, attracted by the Suction fan.

- Rotation of Transfer Belts
When the Main pulley rotates, driven by the Main motor via the Main belt, the Transfer belt drive gear rotates via the Suction drive belt.
The rotation of the gear drives the Suction gear pulley of the Suction unit and the Suction pulley shaft which drive the Transfer belts to transport printed sheets to the Paper receiving tray.

- Function of Suction Fan
The Suction fan, located under the Transfer belts, draws printed sheets onto the Transfer belts for secure paper transfer.

- Paper Transfer Monitoring
The Paper receiving sensors 1 and 2 monitor paper transfer in the paper ejection section to detect paper jams.



2. Separator Positioning System

- Motion of Separator

The Separator, which is mounted on the Separator shaft, is normally at a position close to the Drum to remove a printed sheet.

When the Clamp section of the Drum approaches the Separator, however, the Separator is shifted down off the Drum by the turn of the Separator shaft, which is driven by the Separator lever, in order to provide clearance for the passage of the Clamp section.

- Home Position of Separator

The Separator lever, which is attached at one end of the Separator shaft, has a collar at one end which is held close to the Drum body support (left), and at the other end is kept pressed on the Separator adjustment cam by spring tension. [as shown in Fig. 1]

- Operation of Separator Lever

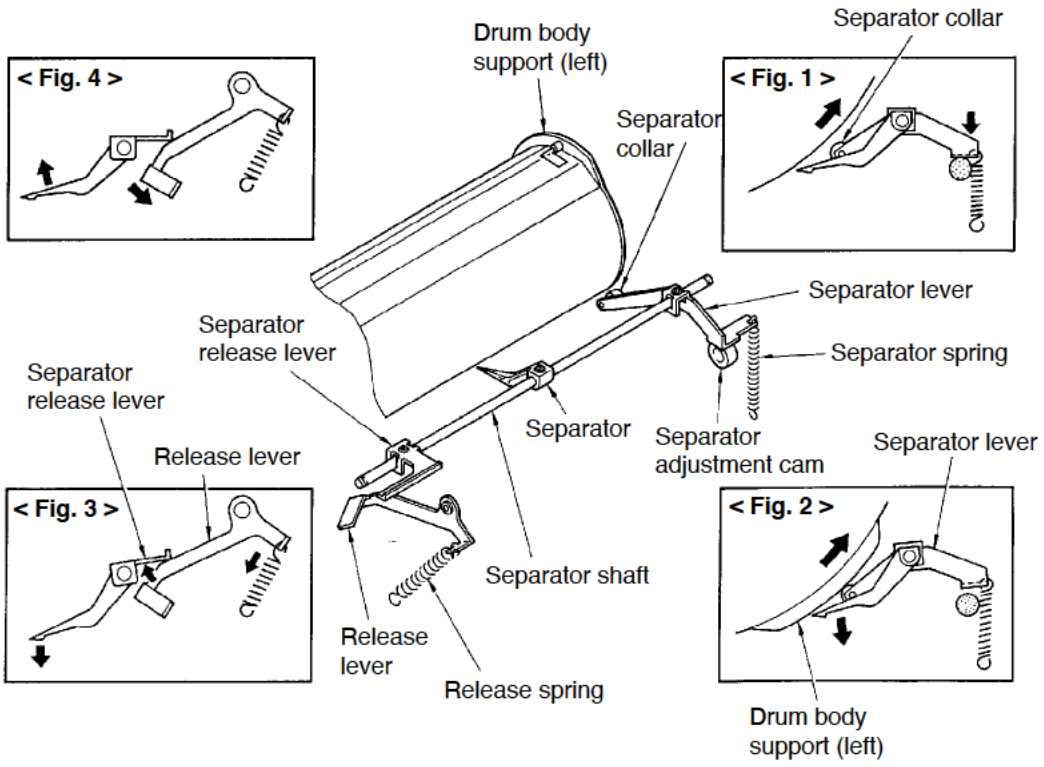
When the Clamp section of the Drum approaches the Separator during rotation, the high point of the Drum body support (left) pushes down the Separator collar, shifting the Separator down off the Drum. [as shown in Fig. 2]

When the Clamp section clears, the Separator is raised close to the Drum again by the spring tension on the Separator lever to remove a printed sheet from the Drum. [as shown in Fig. 1]

- Positioning of Separator In Drum Removal

When the Drum is removed, the Release lever is pulled by the Release spring and turned upward, pushing up the Separator release lever, which is attached at the other end of the Separator shaft. By the shift-up of the Separator release lever, the Separator shaft is turned to lower the Separator off the Drum to avoid damages to the Screen. [as shown in Fig. 3]

When the Drum is locked into position, the Drum frame pushes aside the Release lever, returning the Separator close to the Drum to allow paper separation. [as shown in Fig. 3]



3. Paper Ejection Guides Auto-setting System

- Basic

The paper ejection guides (Jump wings, Side flaps and Belt roller) are automatically positioned for secure paper ejection according to the size of paper.

- Movement of Paper Ejection Guides

The paper ejection guides (Jump wings, Side flaps and Belt roller) change their positions in three ways according to the opened width of the Side guides on the Paper feed tray.

When the Wing motor rotates, the rotation force is transmitted, in the following manner, to the Wing cam shaft, on which the Wing cams, Roller cam and Sw cam are attached.

<Wing motor ᴍ Wing motor pulley ᴍ Belt ᴍ Wing gear ᴍ Cam gear ᴍ Wing cam shaft>

When the Wing cam shaft rotates, the Wing cams rotate, moving up and down the Jump wings and Side flaps, and the Roller cam does, moving up and down the Belt roller.

- Control of Paper Ejection Guides' Position

The two switches, i.e. **Jump wing SW1 and SW2**, keep track of the rotation of the SW cam to arrange the paper ejection guides in the following ways according to the size of paper.

1) For A3 (or Ledger) Size Paper, or for Sorting Operation

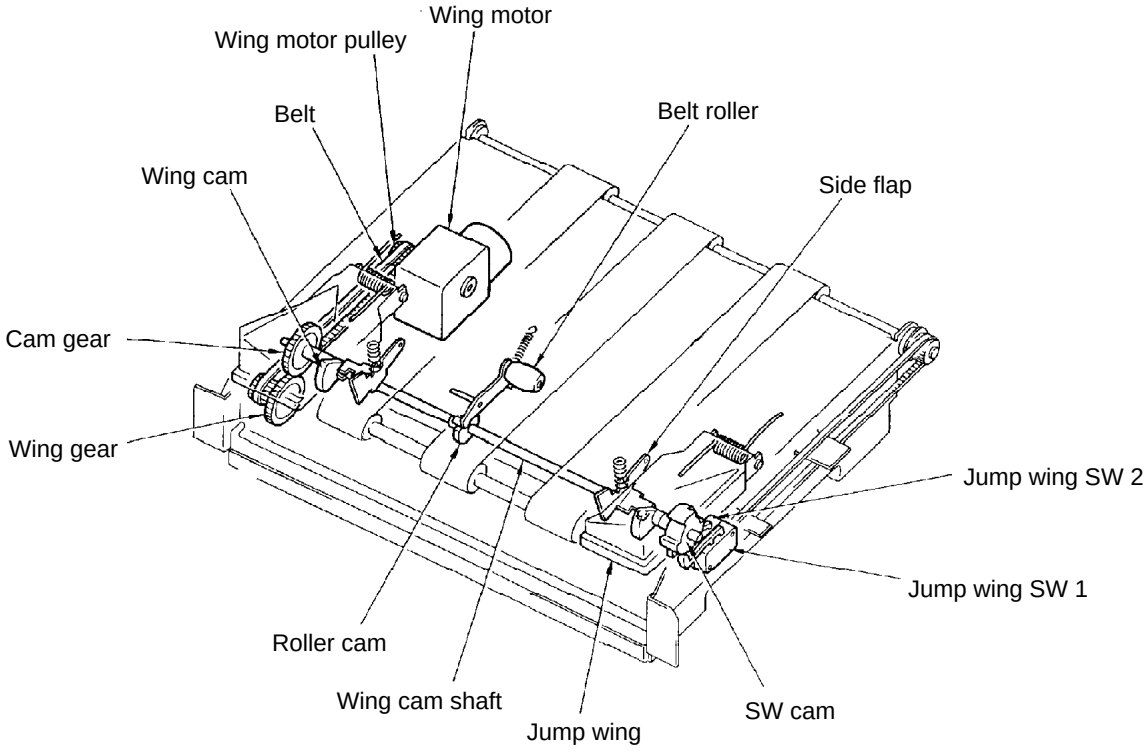
The Wing motor rotates until the Jump wing SW 1 and 2 are both released.
The Jump wings, Belt roller and Side flaps are all lowered, and printed copies are ejected straight out.

2) For Paper Sizes between A3 (or Ledger) and A4 (or Letter)

The Wing motor rotates until the Jump wing SW1 is pressed and SW2 is released.
The Jump wings and Belt roller are raised, and printed copies are ejected in a form of alphabet "W".

3) For Paper Sizes Smaller than A4 (or Letter).

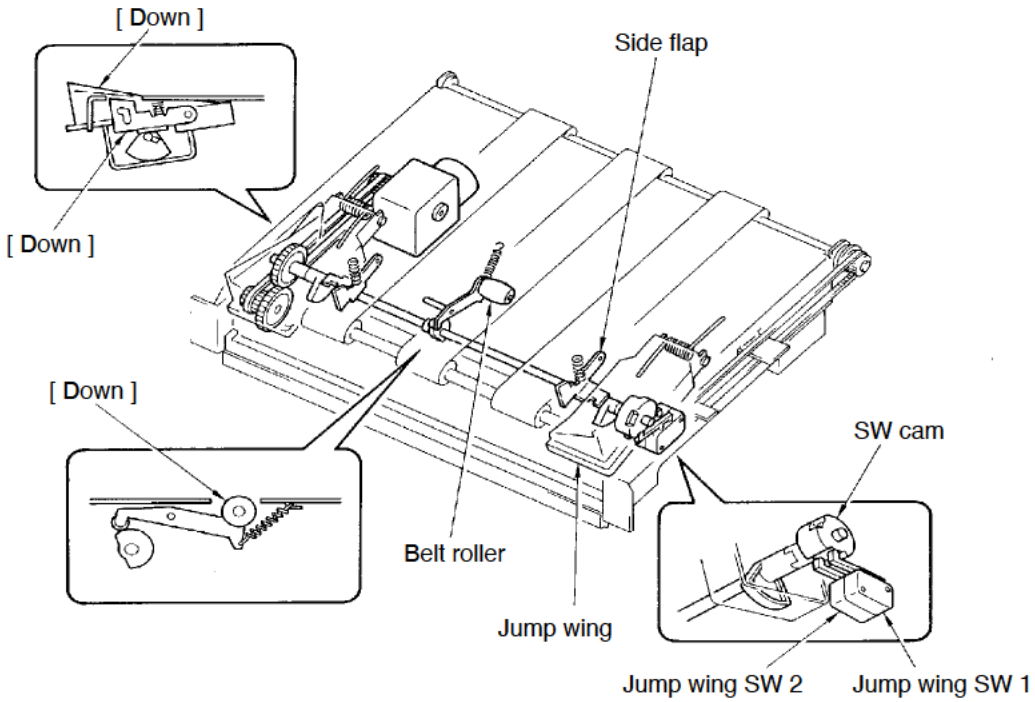
The wing motor rotates until the Jump wing SW1 is released and SW2 is pressed.
The Jump wings and Side flaps are raised, and printed copies are ejected in a form of alphabet "U".



3. Paper Ejection Guides Auto-setting System
1) Setting 1 [A3/Ledger/Sorting]
2) Setting 2 [A4 to A3 / Letter to Ledger]

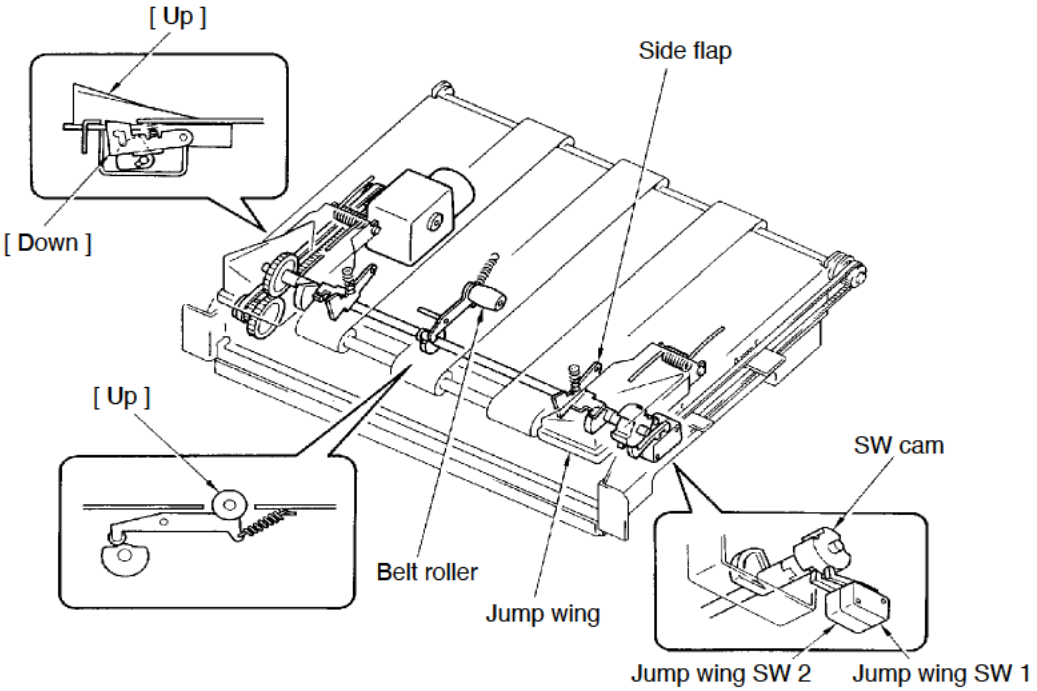
1) Setting 1 [A3 / Ledger / Sorting]

The Wing motor rotates until the Jump wing SW 1 and 2 are both released.
The Jump wings, Belt roller and Side flaps are all lowered, and printed copies are ejected straight out.



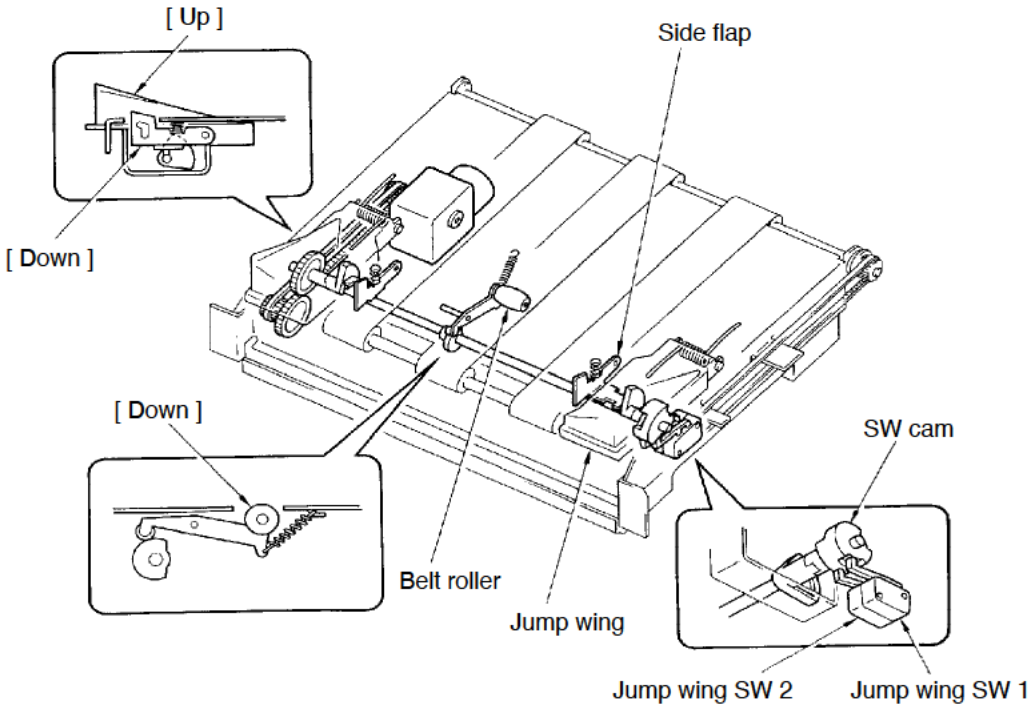
2) Setting 2 [A4 to A3 / Letter to Ledger]

The Wing motor rotates until the Jump wing SW1 is pressed and SW2 is released.
The Jump wings and Belt roller are raised, and printed copies are ejected in a form of alphabet "W".



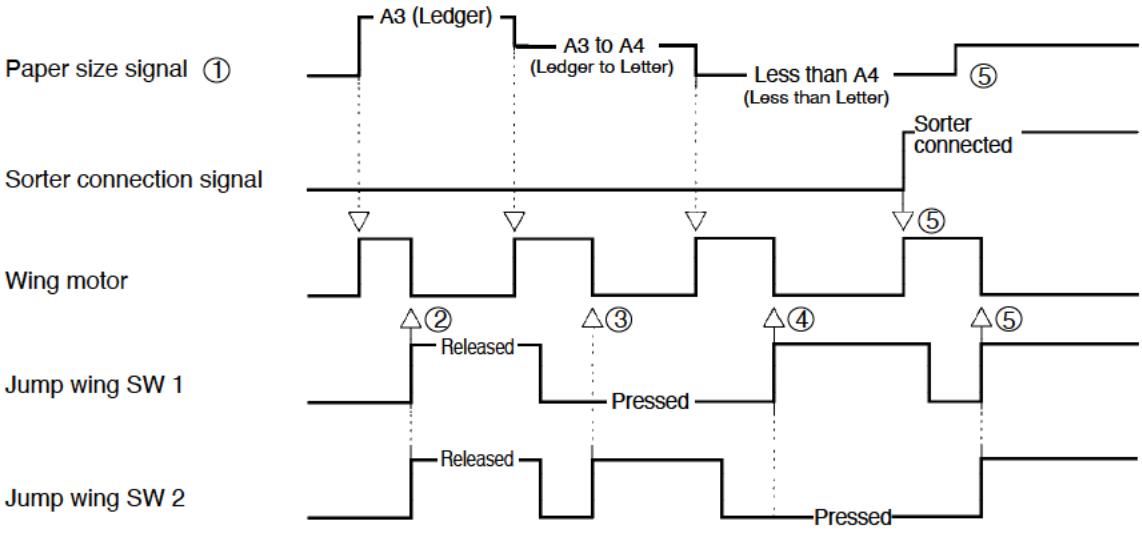
3) Setting 3 [Below A4 / Below Letter]

The wing motor rotates until the Jump wing SW1 is released and SW2 is pressed.
The Jump wings and Side flaps are raised, and printed copies are ejected in a form of alphabet "U".



- Timing Chart -

Paper Ejection Guides Auto-setting System



① The Paper size signal is determined by the information from the Paper feed tray, i.e. Paper size potentiometer and Paper size det. sensor.
② If the paper size is A3 or Ledger, the Wing motor rotates until the Jump wing SW1 and SW2 are released.
③ If the paper size is between A3 and A4 (or Ledger and Letter), the Wing motor rotates until the Wing SW1 is pressed and SW2 is released.
④ If the paper size is less than A4 (or Letter), the Wing motor rotates until the Wing SW1 is released and SW2 is pressed.
⑤ If the Sorter connection signal is ON, i.e. TM2400 is connected, the Wing motor rotates until the Jump wing SW1 and SW2 are released, regardless of the paper size.

* If neither the Jump wing SW1 nor SW2 is actuated ON **within 5 seconds** after the Wing motor is activated with the switch's setting 1 in the chart below, the machine assumes the Wing motor has locked and displays the error code **[E 20]**.
* If either the Jump wing SW1 or SW2 is kept actuated ON **for 5 seconds** since the Wing motor is activated with the switch's setting 2 or 3 in the chart below, the machine assumes the Wing motor has locked and displays the error code **[E 20]**.

Setting	Paper Size	Jump Wing SW		Jump Wing	Belt Roller	Side Flap
		1	2			
1	A3 (Ledger)	OFF	OFF	Down	Down	Down
2	A3 to A4 (Ledger to Letter)	ON	OFF	Up	Up	Down
3	Less than A4 (Less than Letter)	OFF	ON	Up	Down	Up

* "OFF" indicates that the actuator of the switch is released and "ON" that it is pressed.
* If the sorter is connected, the setting 1 is selected regardless of the size of paper.

4. Paper Separation System <GR>

- Separation of Paper

A printed sheet is separated from the Drum by the Separator and Separation fan.

- Air Blow from Separator Tip

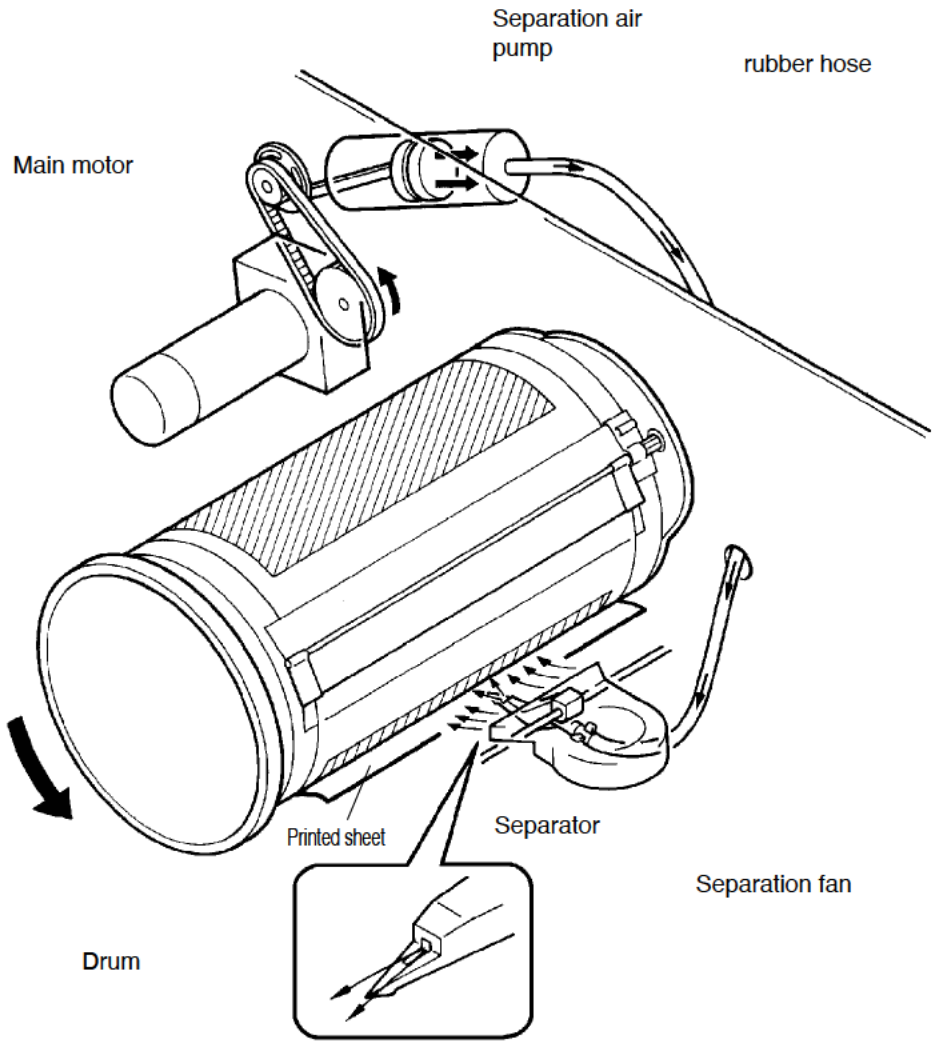
When the lead edge of a printed sheet sticking to the Drum approaches the Separator, air is blown on its center from the tip of the Separator through the operation of the Separation air pump, which is attached on the Rear side frame. As a result, the lead edge of the printed sheet is blown off from the Drum and led to under the Separator.

- Function of Separation Fan

In addition to the air blow from the Separator tip, the Separation fan also blows air on the printed sheet in wide range from above the Separator, assisting the Separator to separate the whole sheet from the Drum.

- Operation of Separation Air Pump

The Separation air pump is driven by the Main motor via a belt and send air to the tip of the Separator through a rubber hose once during one rotation of the Drum, to blow air on the lead edge of the printed sheet in time.



5. Paper Ejection System <GR>

- Paper Transfer

Once a printed sheet is separated from the Drum, it is transported to the Paper receiving tray by the Transfer belts, attracted by the Suction fan.

- Rotation of Transfer Belts

When the Main pulley rotates, driven by the Main motor via the Main belt, the Suction drive junction gear rotates via the Suction drive belt.

The rotation of the junction gear is transmitted to the the Suction gear pulley of the Suction unit via the Suction clutch unit, thus rotating the Suction pulley shaft which drives the Transfer belts to transport printed sheets to the Paper receiving tray.

- Change of Rotation Speed of Transfer Belts

The rotation speed of the Transfer belts is changed in two ways according to the rotation speed of the Drum (print speed), controlled by the Suction clutch.

When the Drum is rotated at a low speed (print speed 1 or 2), the Suction clutch is activated, thus leading the Transfer belts to rotate 1.8 times faster than the Drum to eject printed sheets.

When the Drum is rotated at a high speed (print speed 3, 4 or 5), on the other hand, the clutch is deactivated, thus leading the belts to rotate 1.2 times faster than the Drum.

By accelerating the Transfer belts against the Drum less in high-speed printing in this way, ejected sheets are arranged neatly in the Paper receiving tray in high-speed printing as well.

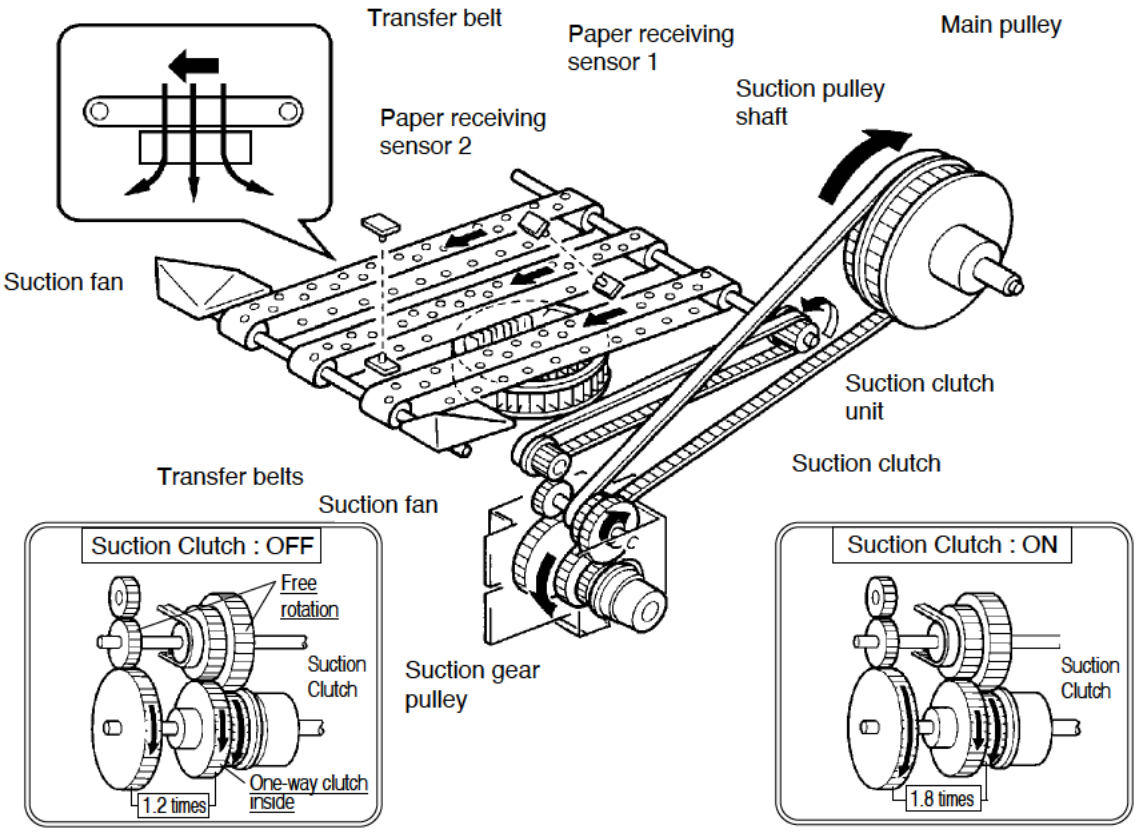
When printing on A3 or Ledger-size paper, however, the Transfer belts are always rotated 1.8 times faster than the Drum regardless of the print speed.

- Function of Suction Fan

The Suction fan, located under the Transfer belts, draws printed sheets onto the Transfer belts for secure paper transfer.

- Paper Transfer Monitoring

The Paper receiving sensors 1 and 2 monitor paper transfer in the paper ejection section to detect paper jams.



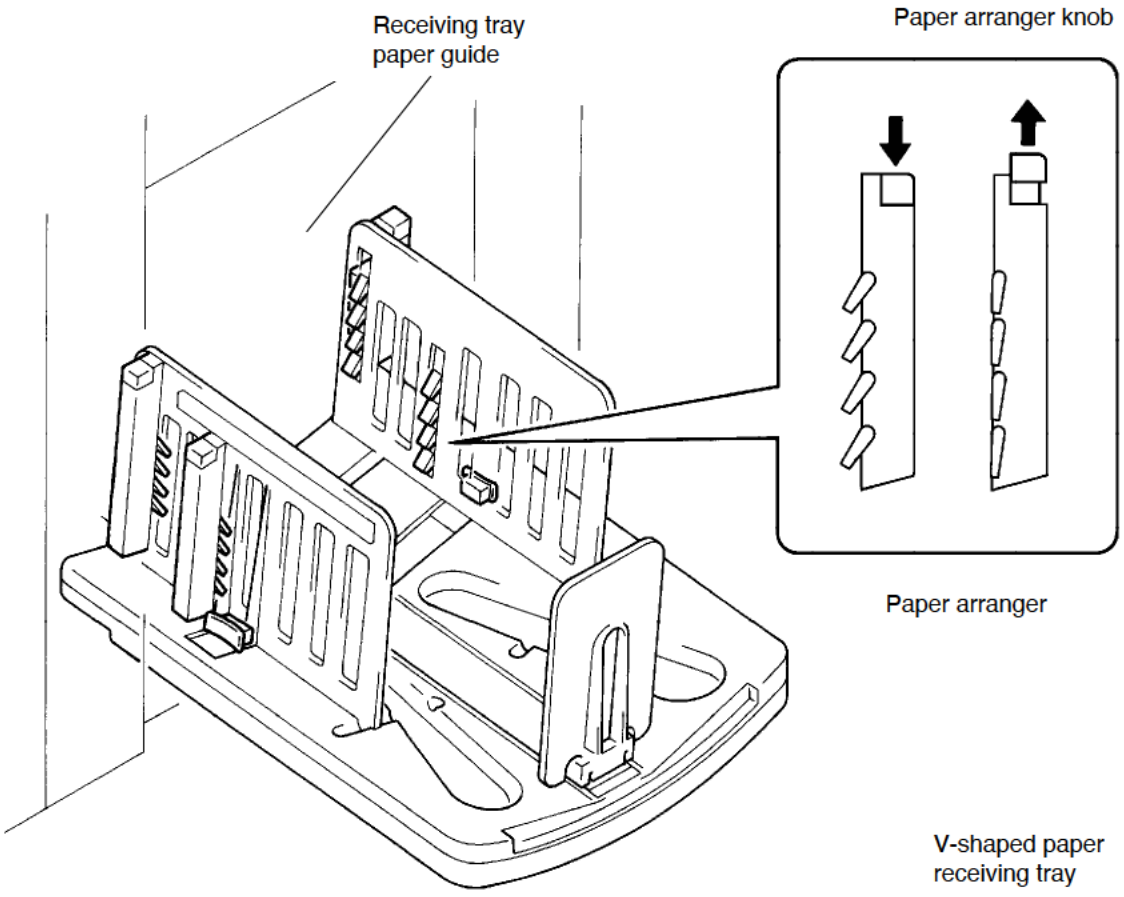
6. Paper Receiving System <GR>

- Precision Stacking Tray

The Receiving tray paper guides are equipped with two arrays of flaps which are weighted square plates. These are called "Paper Arrangers".
The Paper arrangers lead ejected sheets, which mostly curl in a mound shape, to float down on the V-shaped Paper receiving tray in a bowl shape. As a result, ejected sheets are accumulated neatly on the Paper receiving tray with less set-offs.

- Opening / Closing the Paper Arrangers

The Paper arrangers are opened and closed by a push and a pull of the Paper arranger knob.



3. Paper Ejection Section

[Removal and Assembly]

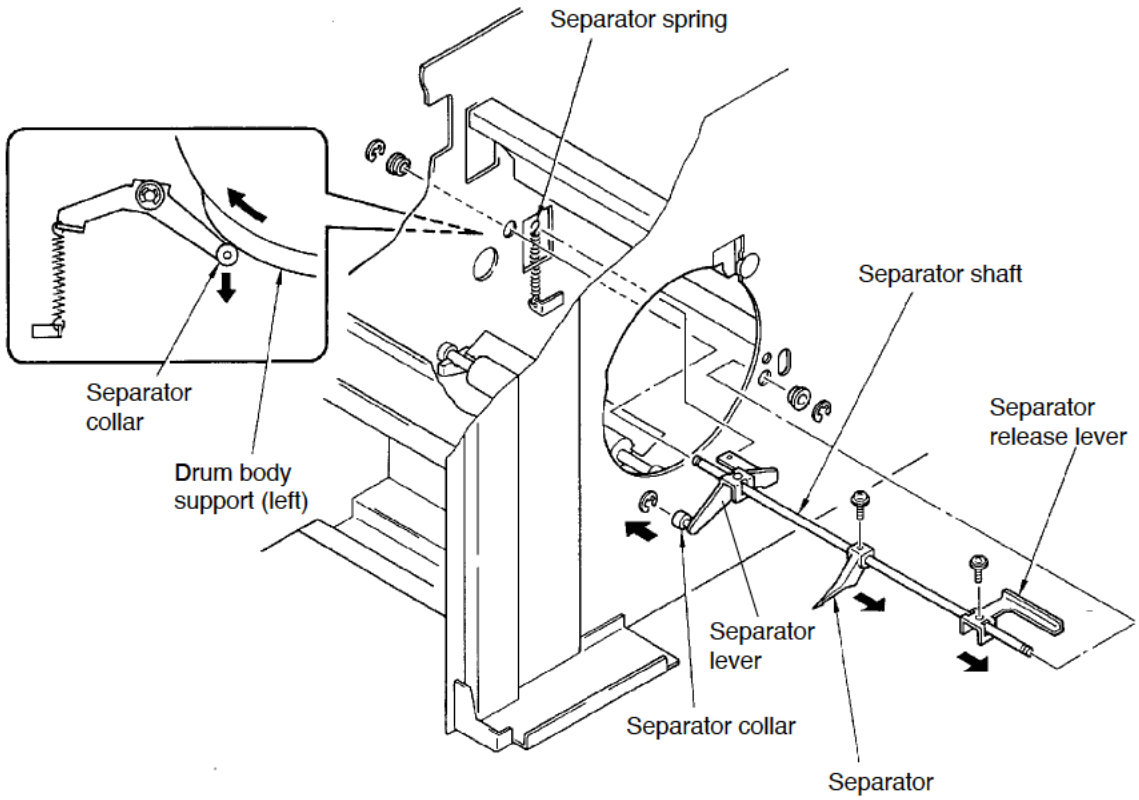
1. Separator

< Removal Procedure >

1. Take out the Drum from the machine and turn OFF the power.
   Remove the Back cover.
2. Unhook the Separator spring from the Separator lever (at the upper point).
3. Remove E rings and metal bearings from both ends of the Separator shaft
4. Take out the Separator ass'y from the opening for the Drum installation.
5. Remove the securing screw on the Separator release lever and slide the lever off the Separator shaft.
6. Remove the securing screw on the Separator and slide the Separator off the Separator shaft.

- Precautions In Assembly -

- Check the position of the Separator after assembly and, if required, adjust it.
  (Refer to the page III-17.)
- Also check that the Separator collar gets in contact with the high (protruding) part of the Drum body support (left) at the middle as indicated in the figure below, by rotating the Drum with a press of SW1 on the System PCB.



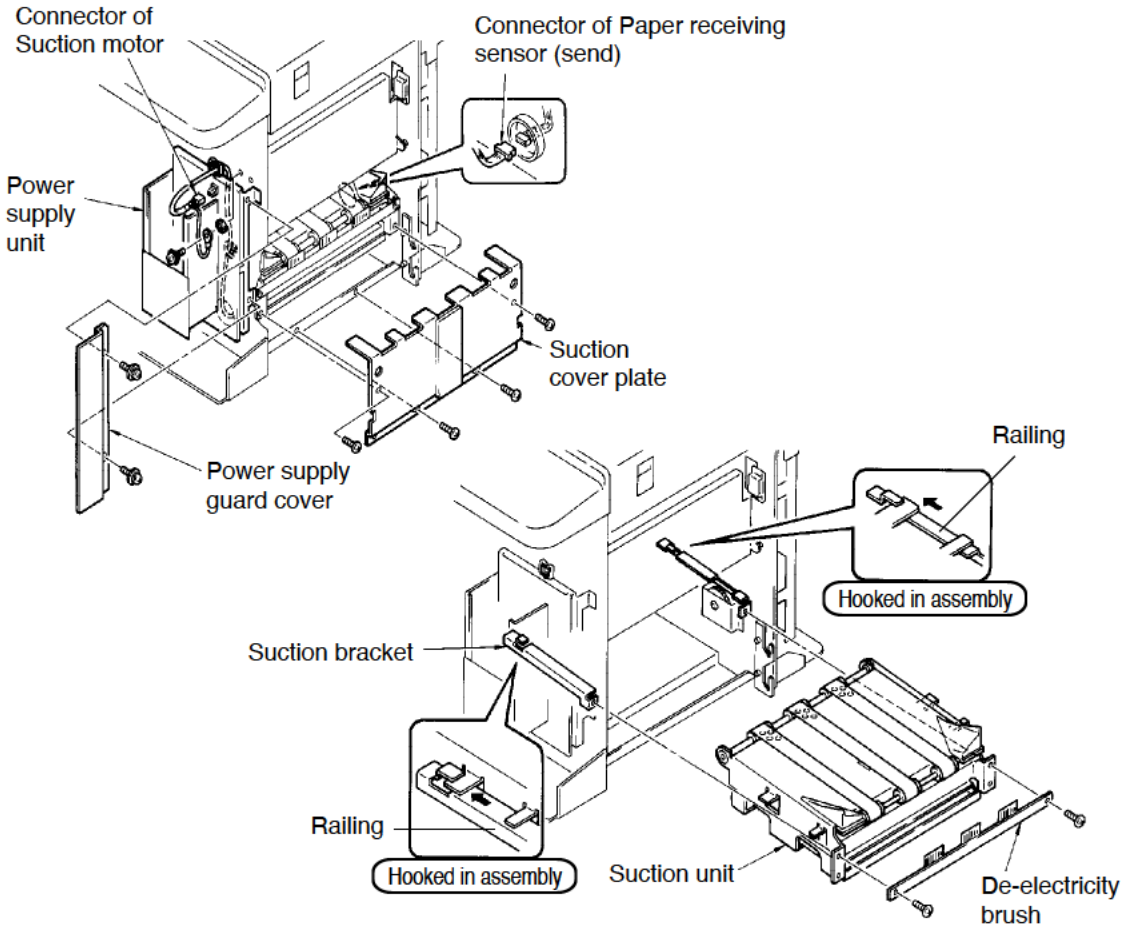
2. Suction Unit

< Removal Procedure >

1. Turn OFF the power, and remove the Paper receiving tray and Front right cover.
2. Remove four mounting screws on the Suction cover plate, and remove the plate.
3. Remove two mounting screws on the Power supply guard cover, and remove the cover.
4. Unscrew and remove the Ground wire of the Suction motor from the Power supply unit and disconnect the connector **CN3M** from the Power supply unit.
   Pull the wire harness of the Suction motor towards the Suction unit.
   [Note]
   The wire harness is clamped onto the Power supply unit at the back of the unit.
5. Disconnect the Connector of the Paper receiving sensor (send).
   Remove two mounting screws on the Suction unit and remove the unit from the machine.
   In this time, a de-electricity brush is also removed (the brush is attached to RA4200 only).

- Precautions In Assembly -

- When installing the Suction unit into the machine, make sure to position it correctly and secure it firmly against the hooks on the railings.
  If not hooked firnly onto the railings, the unit may be raised out of position and hit against the Separator, causing the Transfer belts on the Suction unit torn or the Separator broken.
- Check engagement of the gears between the Suction unit and the machine by rotating the Drum with Test mode **No.62**, after assembly. Reposition the Suction unit if a loud howling noise is heard.



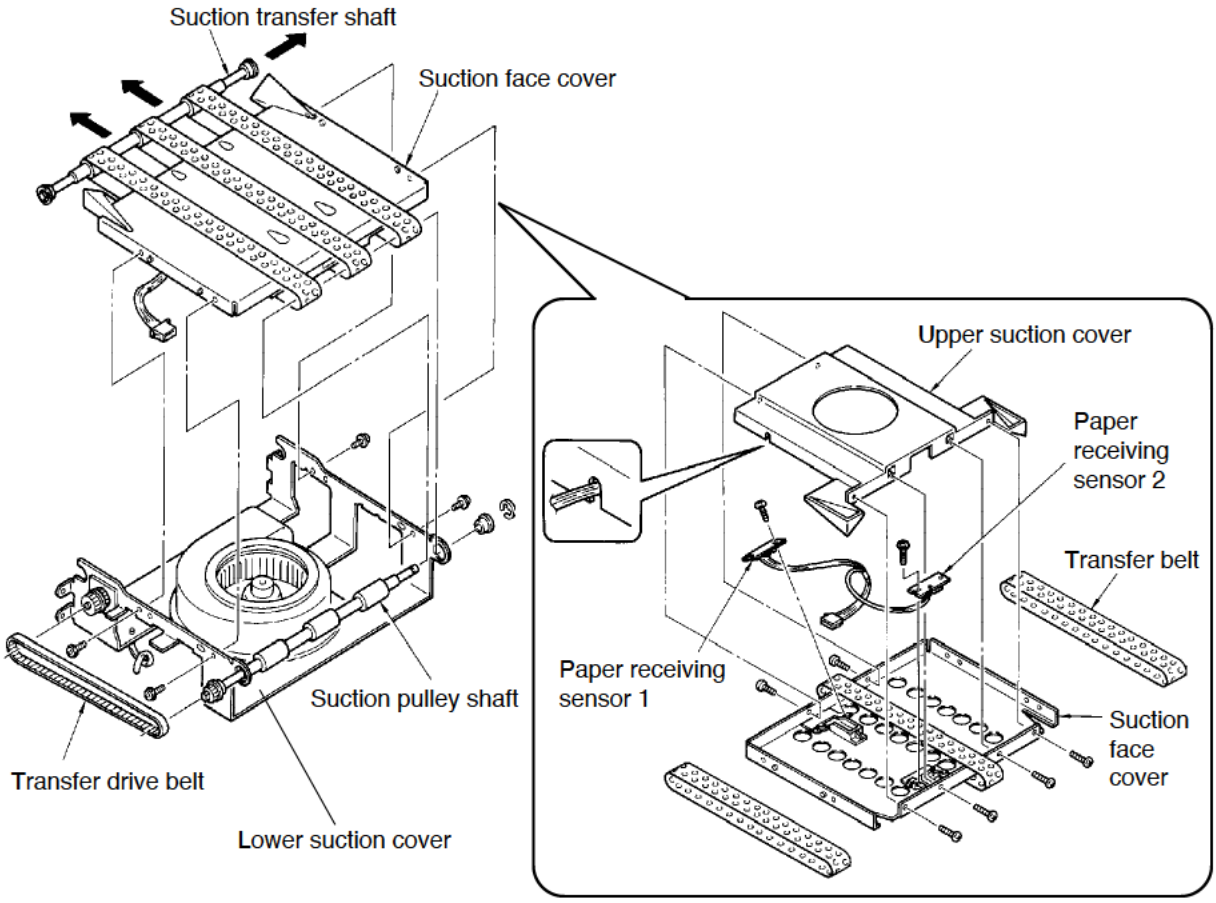
3. Transfer Belt (4200)

< Removal Procedure >

1. Remove the Suction unit from the machine, referring to the previous page.
2. Remove the Transfer drive belt.
3. Remove an E ring and a metal bearing at one end of the Suction pulley shaft and slide out the shaft from the mounting hole of the Lower suction cover.
4. Remove four mounting screws on the Suction face cover.
5. Pull the Suction transfer shaft off the hooks of the Lower suction cover and separate the Suction face cover from the Lower suction cover, sliding the Transfer belts off the Suction pulley shaft.
6. Slide out the Suction transfer shaft through the Transfer belts.
7. Slide the Transfer belts on both sides off the Suction face cover.
8. Remove six mounting screws on the Upper suction cover and remove the cover.
9. Slide the Transfer belt in the middle off the Suction face cover.

- Precautions In Assembly -

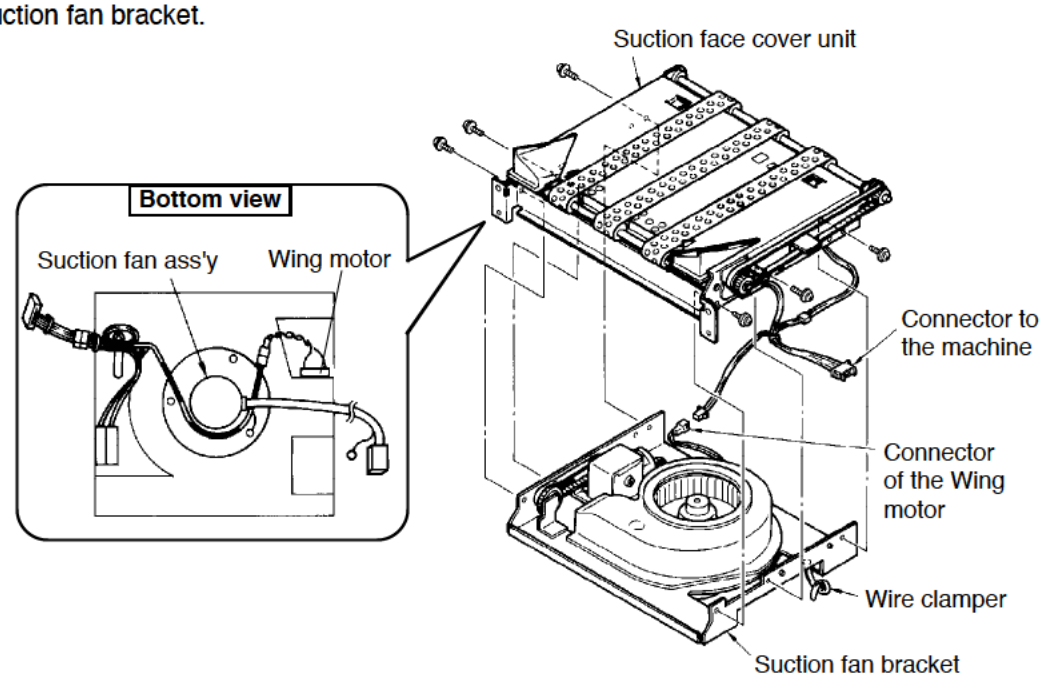
- The positioning bosses on the Lower suction cover should be matched with the holes on the Suction face cover.
- The Wire harness of the Paper receiving sensors should be led through the opening on the Upper suction cover.



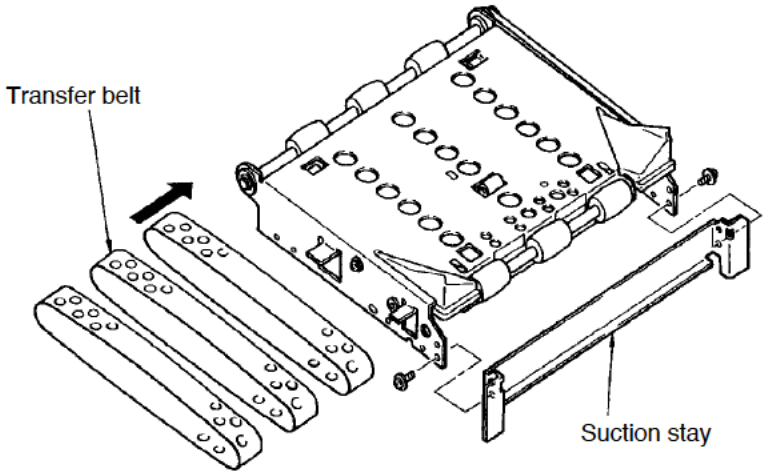
4. Transfer Belt (4900/5900)

< Removal Procedure >

1. Remove the Suction unit from the machine, referring to the page III-8.
2. Remove six mounting screws on the Suction face cover unit.
3. Disconnect the connector of the Wing motor and separate the Suction face cover unit from the Suction fan bracket.



4. Remove two mounting screws on the Suction stay, and remove the stay.
5. Remove the Transfer belts from the Suction face cover.



- Precautions In Assembly -

- The positioning bosses on the Suction stay should be matched with the holes on the Suction face cover.
- The wire harness of the Wing motor should be led around the Suction fan ass'y .
- The positioning bosses on the Suction fan bracket should be matched with the holes on the Suction face cover unit.

5. Wing Cam Shaft

< Removal Procedure >

1. Remove the Suction unit from the machine, referring to the page III-8.
2. Separate the Suction face cover unit from the Suction fan bracket, referring to the previous page.
3. Remove the Transfer drive belt from the pulleys.
4. Remove the mounting screws on the Jump wing plates (two), and remove the plates.
5. Remove E rings and metal bearings at both ends of the Wing cam shaft.
6. Slide out the Wing cam shaft through the Transfer belts.

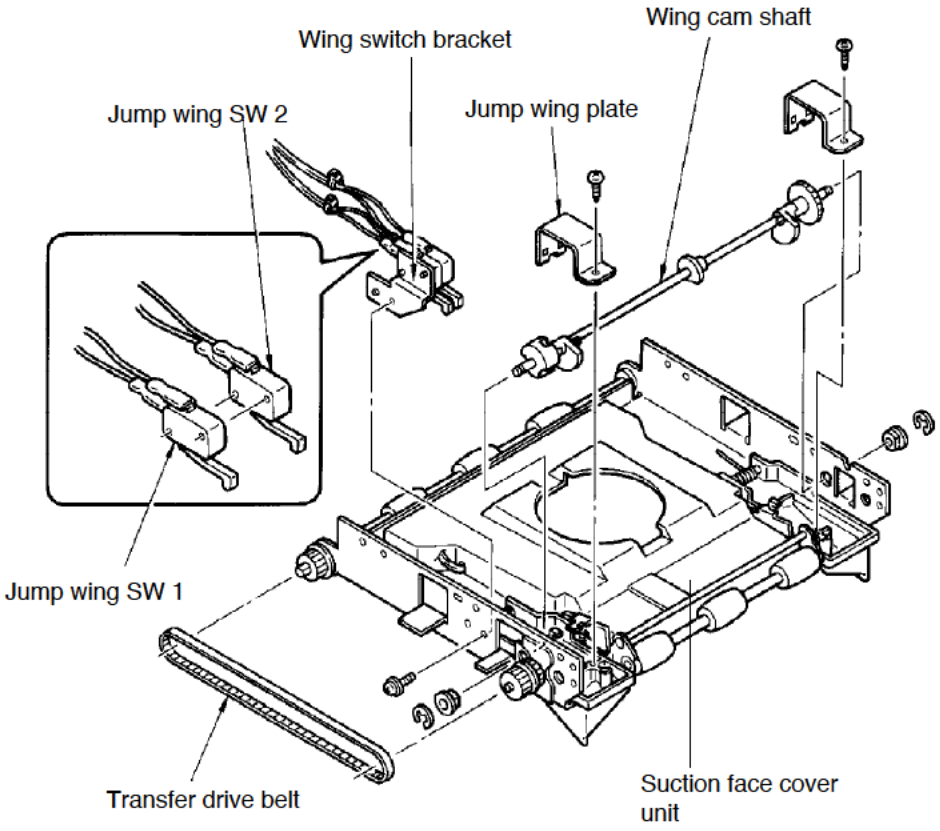
6. Jump Wing Sw

< Removal Procedure >

1. Remove the Suction unit from the machine, referring to the page III-8.
2. Separate the Suction face cover unit from the Suction fan bracket, referring to the previous page.
3. Remove the mounting screw of the Wing switch bracket, and remove the bracket together with the Jump wing switches.
4. Remove wires from the terminals of the Jump wing switches.

- Precautions In Assembly -

- Check after assembly that the Jump wing switches are actuated ON and OFF by manually rotating the Wing cam shaft.



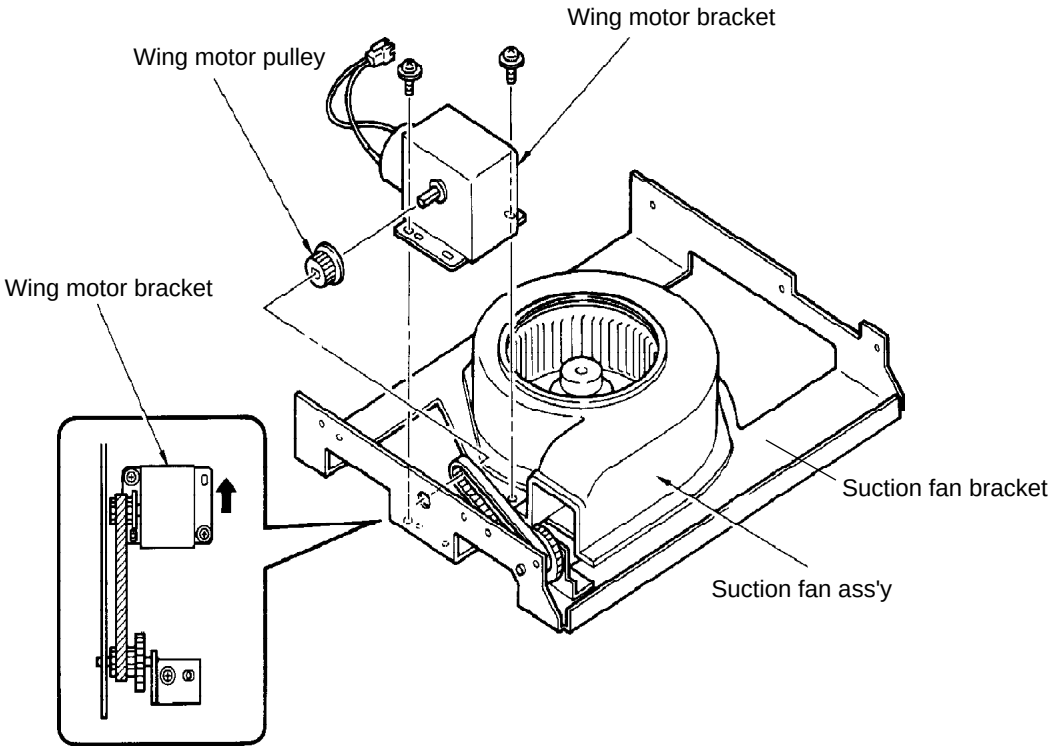
7. Wing Motor

< Removal Procedure >

1. Remove the Suction unit from the machine, referring to the page III-8.
2. Separate the Suction face cover unit from the Suction fan bracket, referring to the page III-10.
3. Remove two mounting screws on the Wing motor bracket, and remove the motor.

- Precautions in Assembly -

- Be careful not to attach the Wing motor pulley in the opposite direction.
- Secure the Wing motor, pulling it to apply tension to the belt.
- The positioning bosses on the Suction fan bracket should be matched with the holes on the Wing motor bracket.



8. Paper Receiving Sensors (Send)

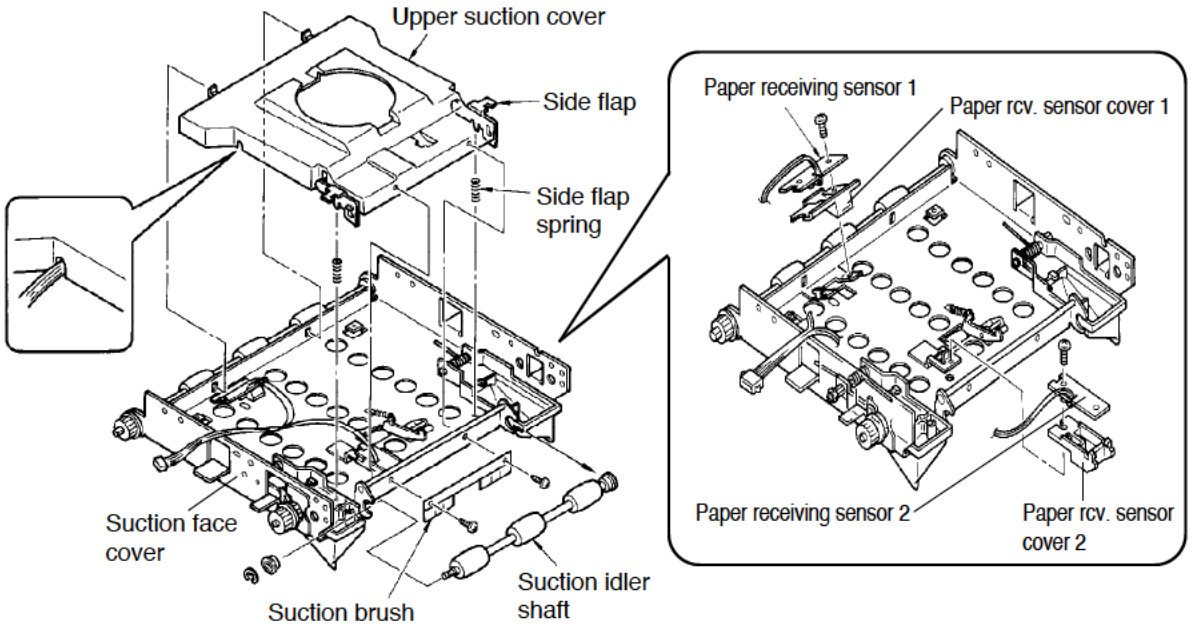
< Removal Procedure >

For RA4900/5900

1. Remove the Suction unit from the machine, referring to the page III-8.
2. Separate the Suction face cover unit from the Suction fan bracket and remove the Transfer belts, referring to the page III-10.
3. Remove the Wing cam shaft and Wing switch bracket, referring to the page III-11.
4. Remove an E ring and a metal bearing at one end of the Suction idler shaft and remove the shaft from the hooks of the Suction face cover.
5. Remove two mounting screws of the Upper suction cover, and remove the cover and the Suction brush.
   [IMPORTANT]
   Be careful not to lose the springs attached onto the Side flaps on both sides of the Upper suction cover.
6. Remove the mounting screws on the Paper receiving sensors 1 and 2, and remove the sensors.

- Precautions In Assembly -

- The Wire harness of the Paper receiving sensors should be led through the opening on the Upper suction cover.
- Insert the hooks of the Upper suction cover into the holes of the Suction face cover.
- Attach the Suction brush to the Suction face cover with the mounting screws of the Upper suction cover.



For RA4200

1. Remove the Suction unit from the machine, referring to the page III-8.
2. Separate the Suction face cover unit from the Suction fan bracket and remove the Transfer belts, referring to the page III-9.
3. Remove the mounting screws on the Paper receiving sensors 1 and 2, and remove the sensors.

- Precautions In Assembly -

- The Wire harness of the Paper receiving sensors should be led through the opening on the Upper suction cover.

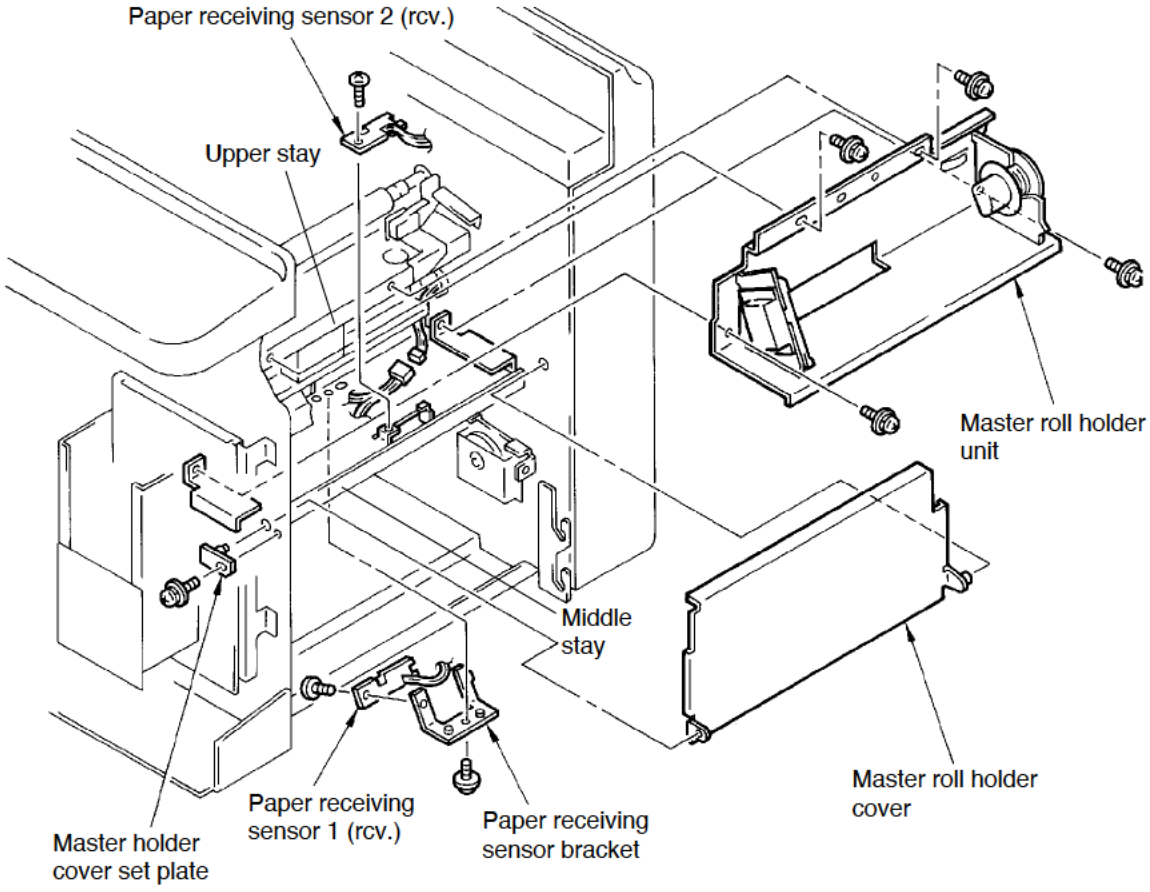
9. Paper Receiving Sensors (Receive)

< Removal Procedure >

1. Remove the Suction unit from the machine, referring to the page III-8.
2. Open the Upper cover (or the Scanner table) and then the Master loading unit
3. Remove the mounting screw on the Master holder cover set plate, and remove the plate. Pull down the Master roll holder cover and remove it.
4. Remove four mounting screws on the Master roll holder unit, and remove the unit.
5. Remove the securing screw on the Paper receiving sensor 2.
6. Disconnect the connector of the Paper receiving sensors (receive).
7. Remove the mounting screw on the Paper receiving sensor bracket, and remove the bracket with the Paper receiving sensor 1 attached, from the bottom of the middle stay. Take out the sensors from below the middle stay, leading the Paper receiving sensor 2 and connector through the space under the Master stocker.
8. Remove the Paper receiving sensor bracket from the Paper receiving sensor 1.

- Precautions In Assembly -

- The positioning bosses on the Paper receiving sensor bracket should be matched with the holes on the middle stay.
- Be careful not to scratch the wires of the sensors on the edge of the middle stay when leading them through the space under the Master stocker.
- The positioning bosses on the upper stay should be matched with the holes on the Master roll holder unit.



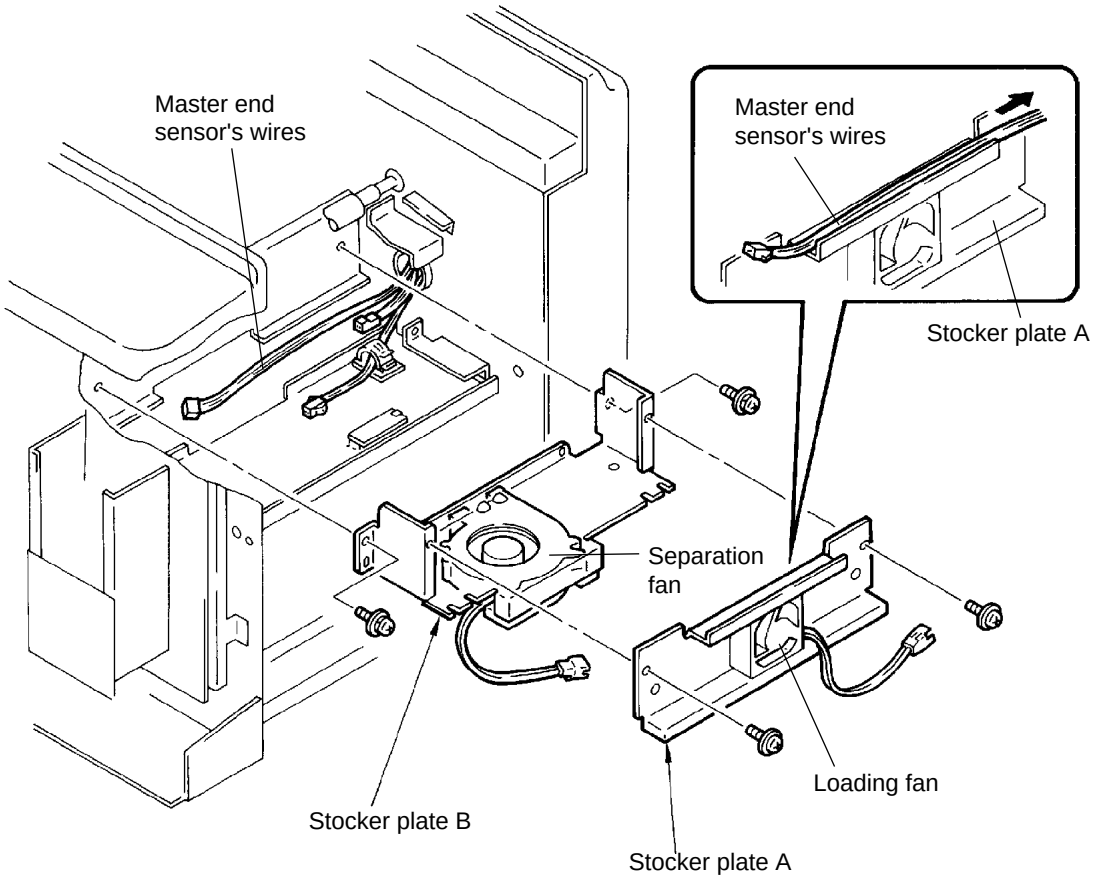
10. Separation Fan

< Removal Procedure >

1. Remove the Master roll holder unit, referring to the previous page.
2. Cut the wire clamper holding the wires of the Loading fan and disconnect its connector.
3. Remove two mounting screws on the Stocker plate A, and remove the plate with the Loading fan attached.
4. Disconnect the connector of the Separation fan and remove two mounting screws on the Stocker plate B.
5. Take out the Stocker plate B with the Separation fan attached, from the machine.
   [IMPORTANT]
   Be careful not to hook the wires lying nearby when taking out the plate.
6. Remove the Separation fan from the Stocker plate B.

- Precautions in Assembly -

- Be careful not to hook the wires running inside when installing the Stocker plates.
- The wires of the Master end sensor should be led over the Stocker plate A.



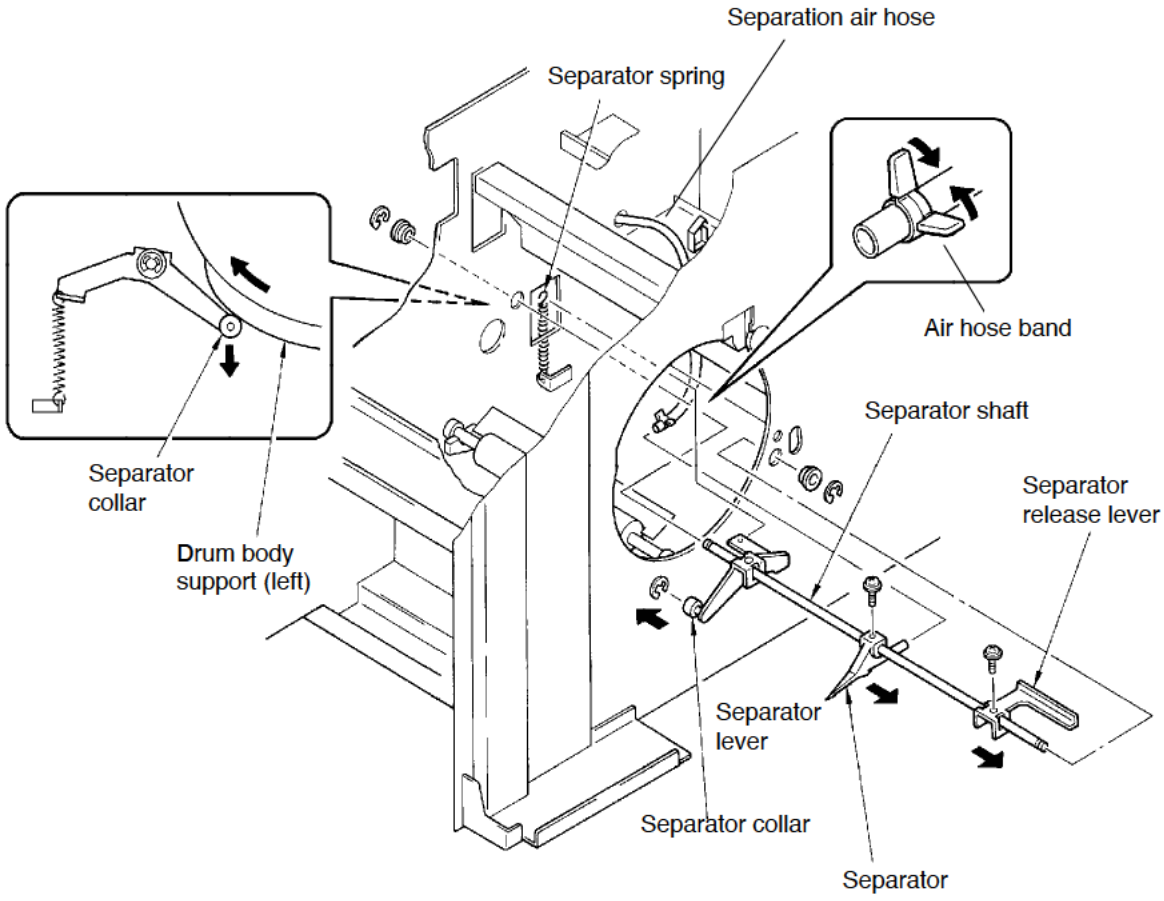
11. Separator <GR>

< Removal Procedure >

1. Take out the Drum from the machine and turn OFF the power.
   Remove the Back cover.
2. Unhook the Separator spring from the Separator lever (at the upper point).
3. Remove E rings and metal bearings from both ends of the Separator shaft.
4. Pinch the knobs of the Hose band on the Separation air hose and shift the band upwards.
   Remove the Separation air hose from the Separator.
5. Take out the Separator ass'y from the opening for the Drum installation.
6. Remove the securing screw on the Separator release lever and slide the lever off the Separator shaft.
7. Remove the securing screw on the Separator and slide the Separator off the Separator shaft.

- Precautions In Assembly -

- Check the position of the Separator after assembly and, if required, adjust it.
  (Refer to the page III-17.)
- Also check that the Separator collar gets in contact with the high (protruding) part of the Drum body support (left) at the middle as indicated in the figure below, by rotating the Drum with a press of SW1 on the System PCB.



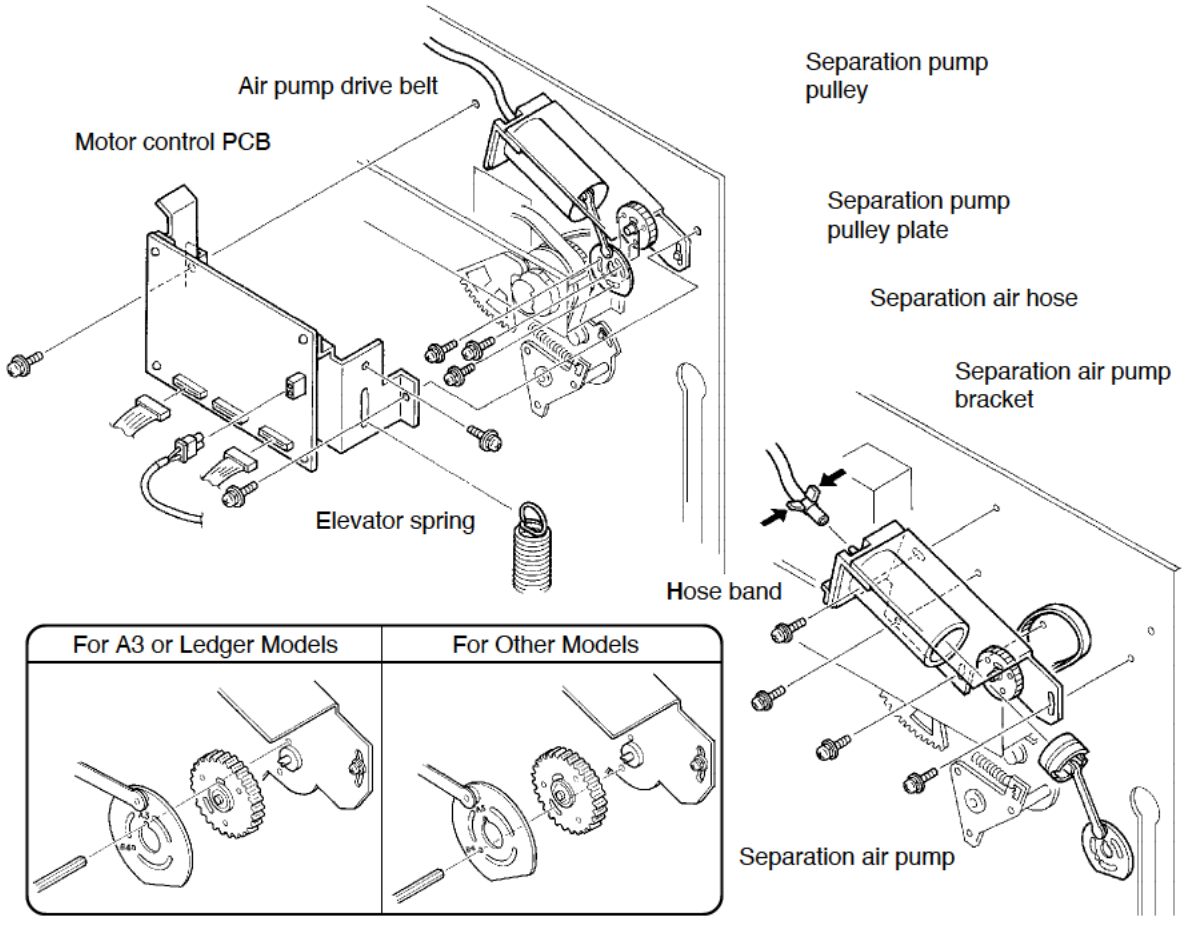
12. Separation Air Pump <GR>

< Removal Procedure >

1. Turn OFF the power and remove the Back cover.
2. Remove the Elevator spring from the Motor control PCB bracket.
3. Disconnect the connectors from the Motor control PCB, remove three mounting screws of the Motor control PCB bracket and remove the bracket with the Motor control PCB attached.
4. Remove three securing screws on the Separation pump pulley plate and separate the plate from the Separation pump pulley.
5. Remove four mounting screws of the Separation air pump bracket and remove the Separation air pump with the bracket attached.
6. Disengage the Air pump drive belt from the Separation pump pulley.
7. Pinch the knobs of the Hose band on the Separation air hose and shift the band upwards. Remove the Separation air hose from the Separation air pump.

- Precautions In Assembly -

- When securing the Separation pump pulley plate onto the Separation pump pulley, be sure to align the notch or hole on the pulley plate with the counterpart on the Separation air pump bracket. For A3 or Ledger model, use the alignment notch maked "A3" on the pulley plate, while for other models, use the alignment hole marked "B4" on it. (Refer to the figures below.)
- When securing the Separation air pump bracket, push it up to apply tension to the Air pump drive belt.



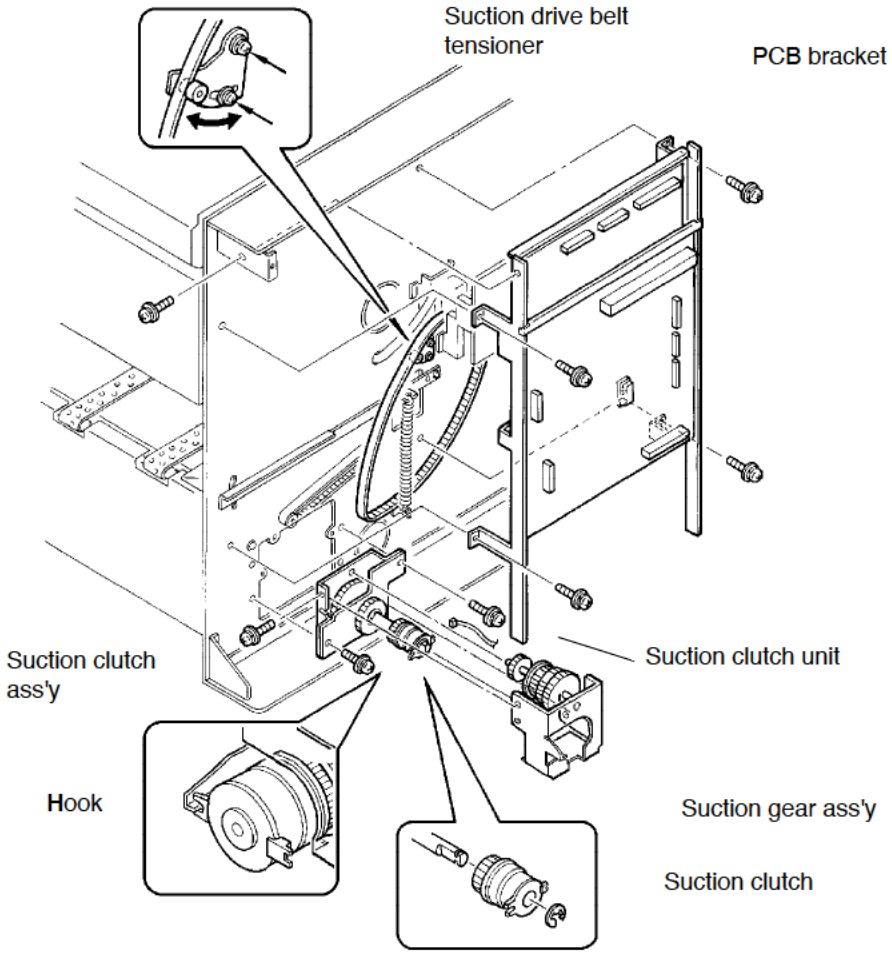
13. Suction Clutch <GR>

< Removal Procedure >

1. Turn OFF the power and remove the Back cover.
2. Disconnect the connectors on the Image processing PCB and System PCB, remove 5 mounting screws of the PCB bracket and remove the bracket with the PCBs attached.
3. Loosen two securing screws on the Suction drive belt tensioner and release the tension of the Suction drive belt.
4. Disconnect the connector of the Suction clutch, remove two mounting screws of the Suction clutch unit and remove the unit from the Side frame.
5. Remove two securing screws on the side of the Suction clutch unit and separate the Suction clutch ass'y from the Suction gear ass'y.
6. Remove an E ring at the top of the Suction clutch shaft and slide the Suction clutch off the shaft.

- Precautions In Assembly -

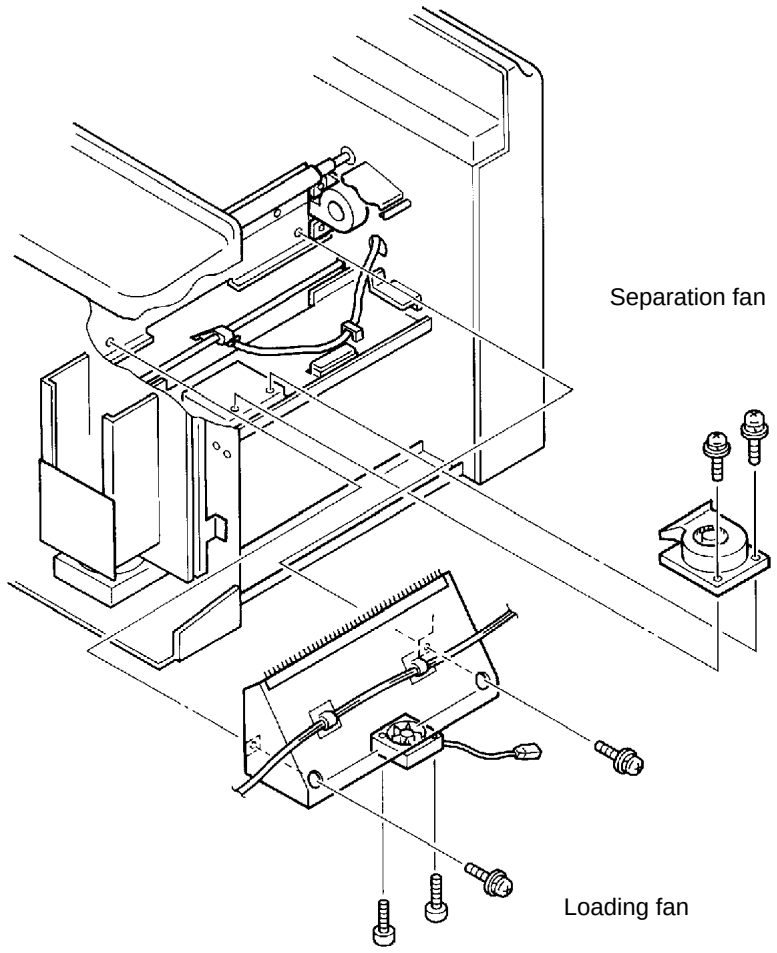
- When joining the Suction clutch ass'y to the Suction gear ass'y, make sure to engage the beak-shaped part of the Suction clutch with the hook of the Suction gear ass'y bracket.
- Adjust the position of the Suction drive belt tensioner to apply tension to the belt.



14. Separation Fan <GR-A3/Ledger>

< Removal Procedure >

1. Remove the Master roll holder unit, referring to the page III-14.
2. Remove two mounting screws of the Separation fan and remove the fan from the bracket.
   [Note]
   Disconnect the connector of the Loading fan and remove the Stocker ass'y, if required, to remove the Separation fan.



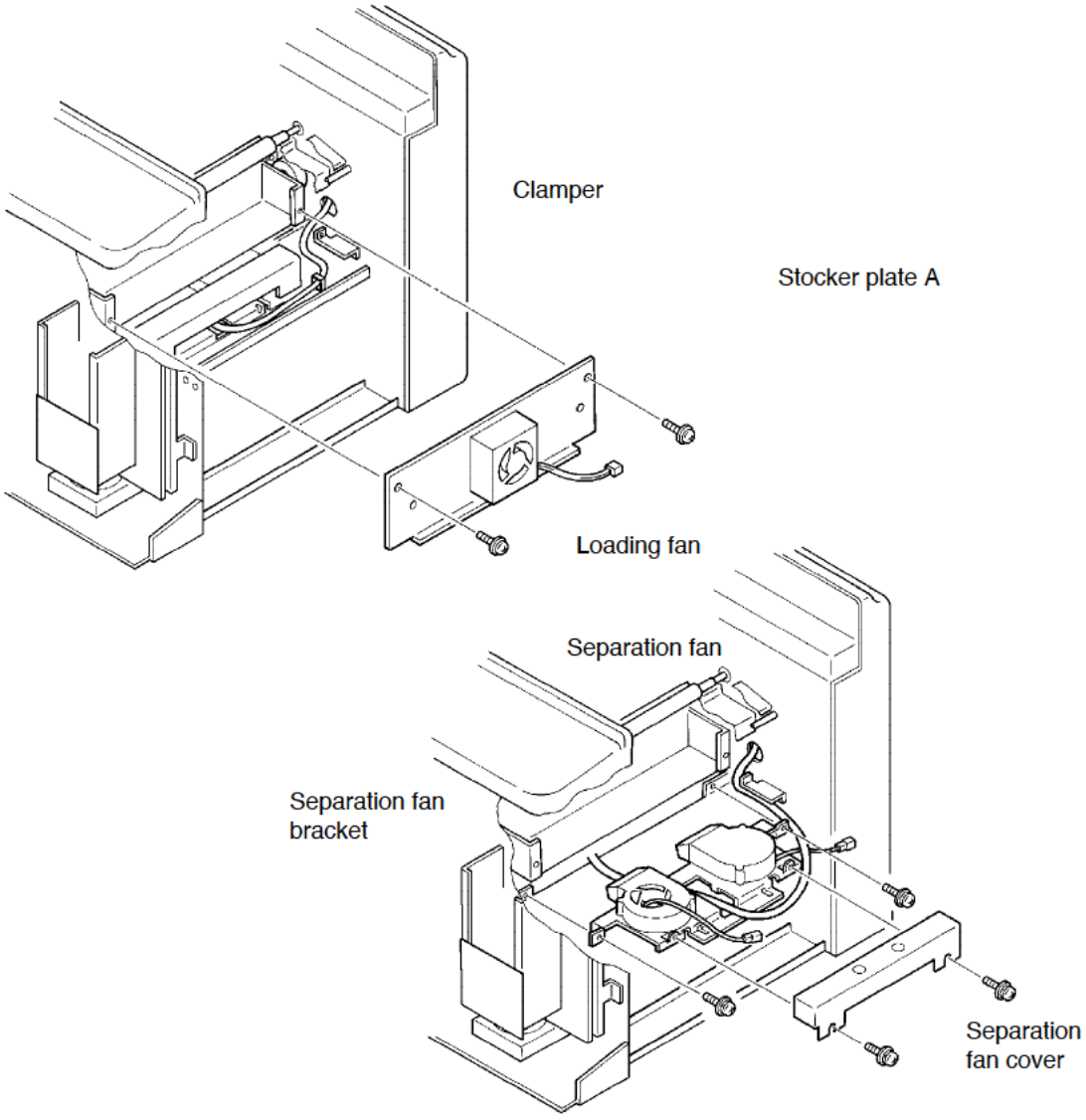
15. Separation Fan <GR-B4/A4/Legal>

< Removal Procedure >

1. Remove the Master roll holder unit, referring to the the page III-14.
2. Disconnect the connector of the Loading fan, remove two mounting screws on the Stocker plate A and remove the plate with the Loading fan attached.
3. Release the Separation air pump from the clamper, remove two mounting screws of the Separation fan cover and remove the cover.
4. Remove four mounting screws of the Separation fan bracket and take out the bracket with the Separation fans attached, along the Separation air hose from the machine.
   [IMPORTANT]
   Be careful not to hook the wires lying nearby when taking out the plate.
5. Disconnect the connector of the Separation fan and remove two mounting screws of the Separation fan from the bracket.

- Precautions In Assembly -

- Be careful not to hook the wires running inside when installing the Separation fan bracket.



3. Paper Ejection Section

[Adjustment]

1. Position of Separator

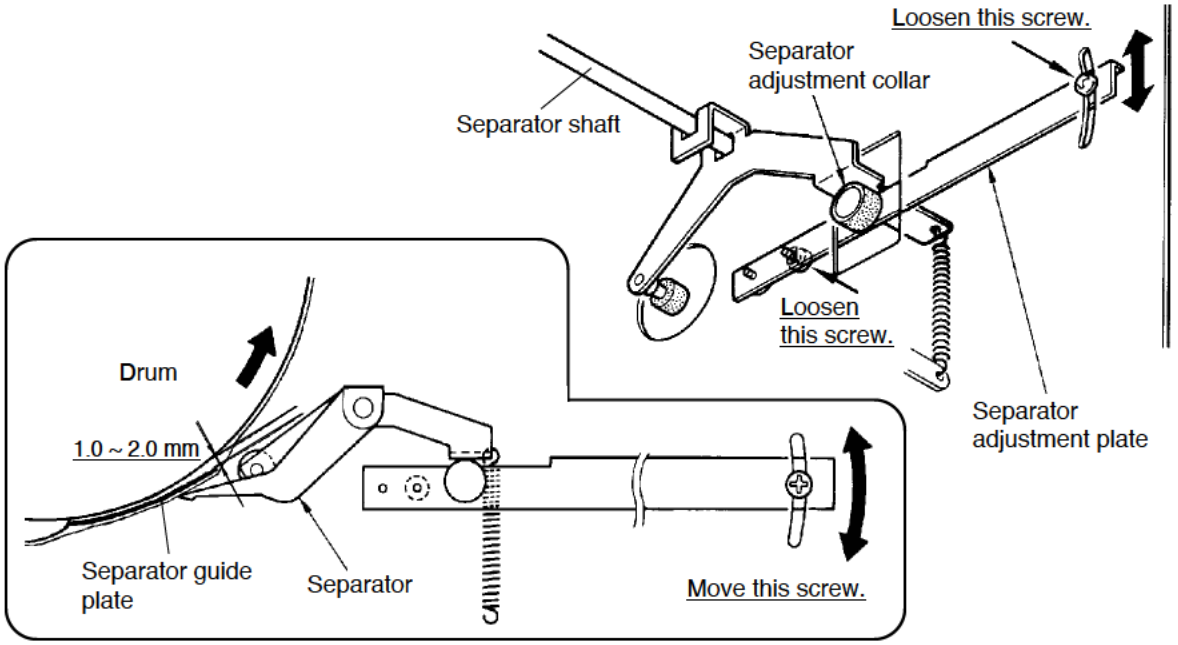
1. Remove the Back cover.
2. Rotate the Drum by pressing **SW1** on the **System PCB** until the Separator guide plate on the Drum is placed over the tip of the Separator.
   Turn OFF the power.
3. Check if the tip of the Separator is lightly in contact with the Separator guide plate.
4. If not, loosen the securing screws of the Separator adjustment plate on the plate itself and on the side frame of the machine to adjust the position of the Separator.
   Move up or down the Separator adjustment plate by moving the securing screw on the side frame to place the Separator at the position where its tip is in slight contact with the Separator guide plate.
5. Tighten the securing screws of the adjustment plate and turn ON the power.
6. Check by rotating the Drum with a press of SW1 on the System PCB that the Separator does not get in contact with the surface of the Drum at any other positions but on the Separator guide plate.
7. If it does, re-adjust the position of the Separator by repeating the procedures in the steps 2 to 4 above.

- Precautions In Adjustment -

- Before checking the position of the Separator, make sure that the tip of the Separator guide plate is **1.0 ~ 2.0 mm** off the Drum.
- Check that a printed sheet is separated from the Drum if it has at least a **10mm**-margin at the top after adjustment.

- Results of Misadjustment -

- If the tip of the Separator is in contact with the Drum;
  it will scratch the surface of the master on the Drum, creating black lines in the middle of printed copies or will damage the screens.
- If the tip of the Separator is placed far off the Drum (not in contact with the Separator guide plate); printed copies will not be separated from the Drum, causing paper jams and the error code **[E 34]** will be displayed on the operation panel.



2. Position of Separator <GR>

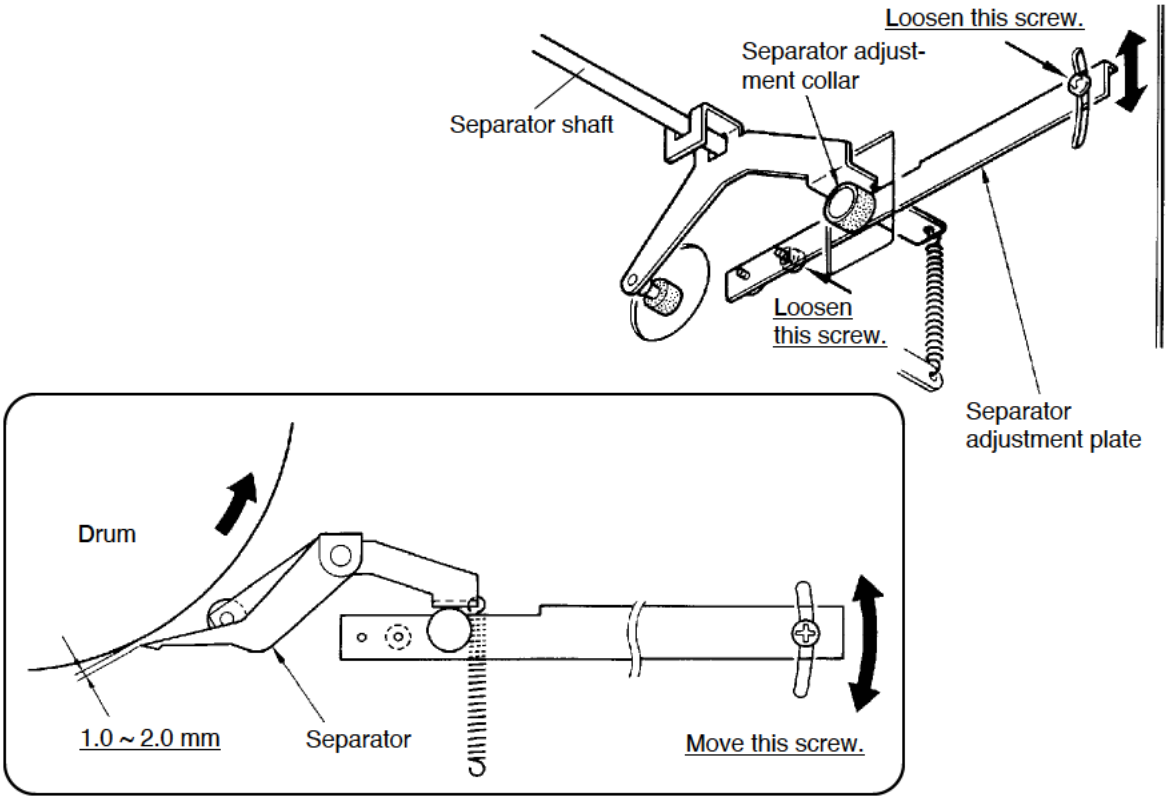
1. Remove the Back cover.
2. Rotate the Drum by pressing **SW1** on the **System PCB** until the tip of the Separator is positioned close to the surface of the Drum, if necessay.
   Turn OFF the power.
3. Check if the tip of the Separator is **1.0 ~ 2.0 mm** off the Drum.
4. If not, loosen the securing screws of the Separator adjustment plate on the plate itself and on the side frame of the machine to adjust the position of the Separator.
   Move up or down the Separator adjustment plate by moving the securing screw on the side frame to place the Separator at the position where its tip is **1.0 ~ 2.0 mm** off the Drum.
5. Tighten the securing screws of the adjustment plate and turn ON the power.
6. Check by rotating the Drum with a press of SW1 on the System PCB that the Separator does not get in contact with the surface of the Drum at any other positions.
7. If it does, re-adjust the position of the Separator by repeating the procedures in the steps 2 to 4 above.

- Precautions In Adjustment -

- Check that a printed sheet is separated from the Drum if it has at least a **10mm**-margin at the top after adjustment.

- Results of Misadjustment -

- If the tip of the Separator is in contact with the Drum;
  it will scratch the surface of the master on the Drum, creating black lines in the middle of printed copies or will damage the screens.
- If the tip of the Separator is placed far off the Drum;
  printed copies will not be separated from the Drum, causing paper jams.



3. Air Power Adjustment of Separation Fan <GR>

1. Use Memory SW **No. 89** (Test mode No.89) to overcome paper separation problems with papers which are soft or light.
   A strong air blown on certain types of papers causes the papers to waver, creating paper jams.
2. The power adjustment of the Separation fan can be selected 3 ways.
   100%, 50% or 30%.
3. Select the Memory SW **No.89** and use the PRINT POSITION key on the operation panel to select a desired Memory SW setting number, referring to the chart below.
4. **To input the selected Memory SW setting into the machine, press the STOP key and then the ALL RESET key.**
   The panel display returns to an ordinary indication.

- Precautions in Adjustment -

- The once-input Memory SW setting cannot be erased even if Test mode **No.90** or **97** is activated or when the System ROM is replaced.
- The Memory SW setting is erased when the **System PCB** is replaced or when Test mode **No.98** is applied. In this case, all other Memory SW settings will also be erased.

Memory Sw No. 89 (Test mode No.89)

Memory Sw Setting	0	1	2
Separation Fan Air	100%	50%	30%

4.Drum Section

[Theory of Operation]

1. Drum Rotation Rear Check System

- Basic

On the rear side (the drive mechanism side) of the machine, two points are specified in a cycle of the Drum to cue given sensors or solenoids for operation in given cases.

- Detection of Cue Points

To detect these cue points, **Pressure detection sensor**, which is attached on the Main shaft face plate, checks the passage of **Pressure sensor disc**, which is attached to the end of the Main shaft.

- **Cue Point 1 <Pressure Position 1>**

  This is the position where the light path of the Pressure detection sensor has just been opened and the Drum is a little less than a quarter of a turn off the Position A.

  At this position, the following objects are cued for given operations:

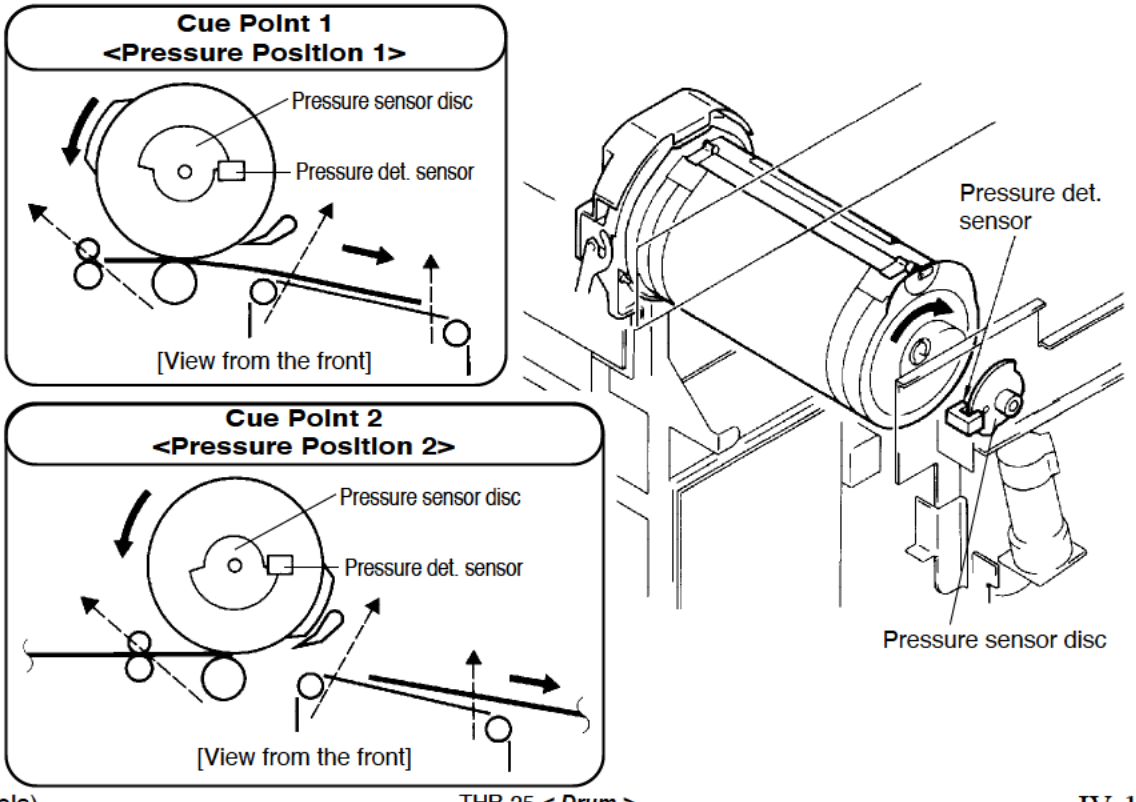
  1) the Separation fan stops blowing air *in master removal*.
  2) **the Pressure solenoid is deactivated *in printing*.**
  3) the Paper sensor checks the presence of paper in the 2nd paper feed section i*n printing*.

- **Cue Point 2 <Pressure Position 2>**

  This is the position where the light path of the Pressure detection sensor has just been blocked and the Drum is a little less than three quarters of a turn off the Position A.

  At this position, the following objects are cued for given operations:

  1) the Main motor changes the rotation speed from 30rpm to 15rpm *in master removal* and *at the end of printing*.
  2) **the Print count signal is output to increase the total print count *in printing*.**
  3) the Paper sensor checks the presence of paper in the 2nd paper feed section *in printing*.
  4) **the Paper receiving sensor 1 checks for detection of paper jams whether no paper remains between *in printing*.**



2. Drum Rotation Front Check System

- Basic

On the front side (the operation panel side) of the machine, three points are specified in a cycle of the Drum to cue given sensors, motors or solenoids for operation in given cases.

- Detection of Cue Points

To detect these cue points, **Position A sensor** and **Position C sensor**, which are built into the rear side of the Drum control PCB, check the passage of three metal plates, **Plate A**, **Plate C-1** and **Plate C-2**, all of which are attached to the Drum body support (right).

• Cue Point 3 <Position A>

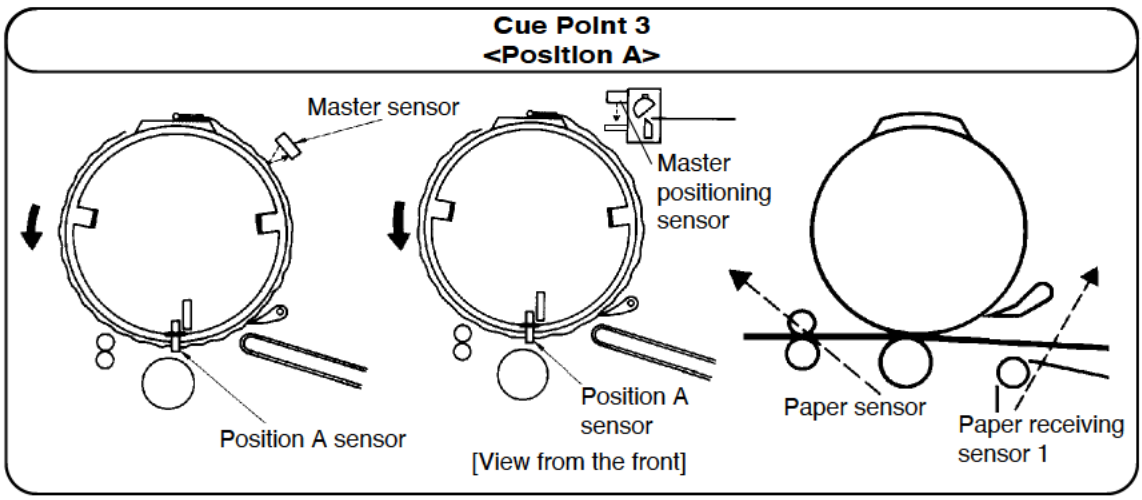
This is the basic position (home position) in a cycle of the Drum, where the light path of the Position A sensor is blocked by the Plate A.

At this position, the following objects are cued for given operations:

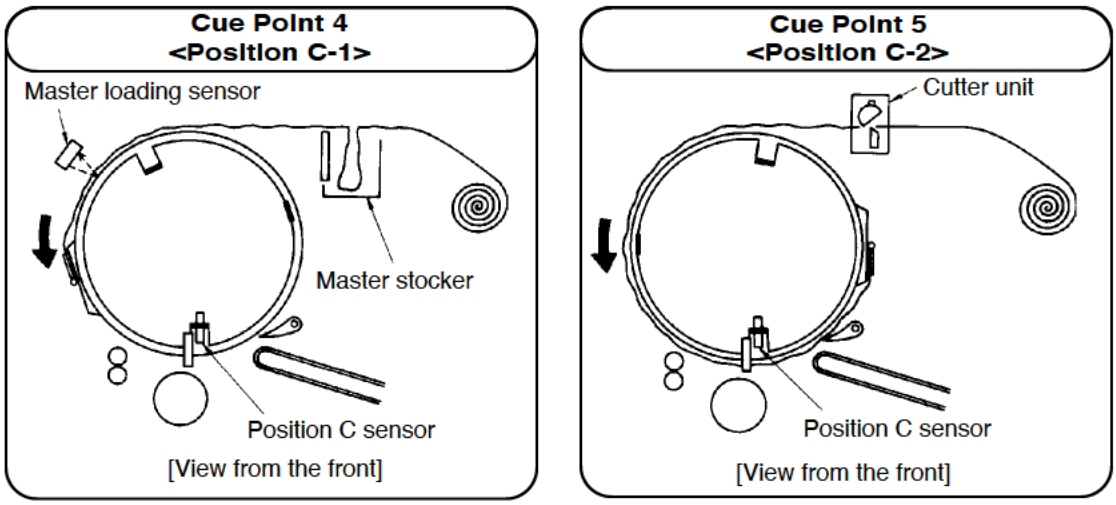
1) the Lock solenoid is activated to unlock the Drum when the latter is not in operation.
2) the Separation fan starts blowing air *before master removal*.
3) the Angular sensors checks the position of the Angular magnet *before master removal*.
4) the Master positioning sensor checks the presence of master below *before master removal*.
5) the Master removal sensor finishes to check the presence of master between itself *at the end of master removal*.
6) the Clamp solenoid is activated to open the Clamp plate *in master removal* and close it *in master loading*.
7) the Main motor changes the rotation speed from 15rpm to 30rpm *in master loading*.
8) **the Master sesnor checks the presence of master on the Drum *before master removal* and *printing*.**
9) **the Master positioning sensor checks for detection of master cut error whether no master remains below *after master cutting*.**
10) the Suction fan stops operating after the first sample print is ejected and after the last sheet is ejected *in printing*.
11) the Separation fan stops blowing air after the last sheet is ejected *in printing*.
12) the Main motor slows down the speed to 30rpm after the last sheet is ejected *in printing*.
13) the Write pulse motor starts and stops rotating *in confidential operation*.
14) the Main motor stops rotating *in master removal*, *master loading* and *at the end of printing*.
15) **the Paper sensor checks the presence of paper in the 2nd paper feed section *in printing*.**
16) **the Paper receiving sensor 1 checks the presence of paper between itself *in printing*.**

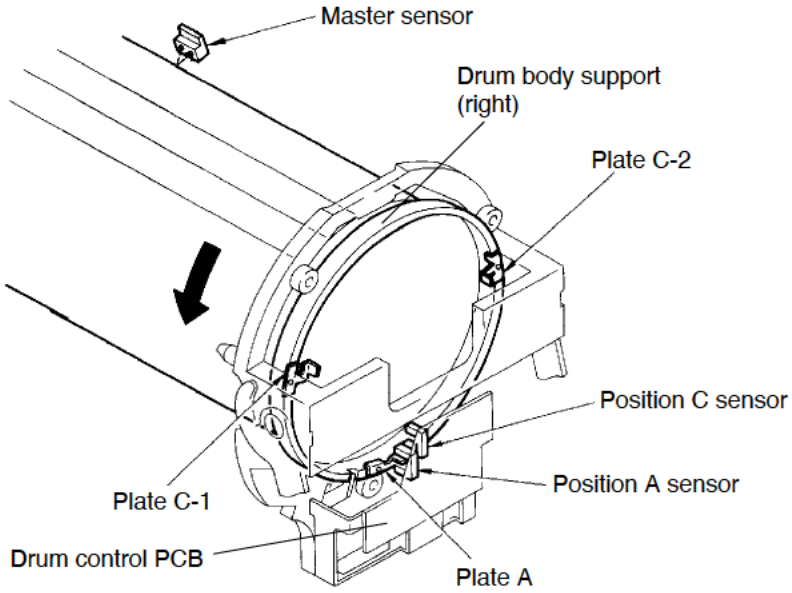
[Note]

The Position A sensor also detects “Main motor Lock” by checking the rotation of the Drum.



- **Cue Point 4 <Position C-1>**
  This is the position where the light path of the Position C sensor is blocked by Plate C-1 and the Drum is a little more than a quarter of a turn off the Position A.
  At this position, the following objects are cued for given operations:
  1) the Main motor changes the rotation speed from 15rpm to 30rpm *in master removal*.
  2) the Master removal sensor starts to check the presence of master between itself *in master removal*.
  3) **the Master loading sensor checks if a master is correctly loaded on the Drum *in master loading*.**
  4) **the Master count signal is output to increase the total master count *in master loading*.**
- **Cue Point 5 <Position C-2>**
  This is the position where the light path of the Position C sensor is blocked by Plate C-2 and the Drum is about three quarters of a turn off the Position A.
  At this position, the following objects are cued for given operations:
  1) the Cutter motor is activated to cut a master *after master loading*.
  2) the Loading fan stops operating *after master loading*.
  3) the Thermal pressure motor is activated ON *after master cutting*.





3. Drum Locking System

- Lock for Drum Rotation

The Lock plate is inserted into the slit of the Drum body support (right) to lock the drum rotation when the Drum is out of the machine. When the Drum is installed in the machine, the Lock plate is pushed off the slit by the machine's side frame allowing the Drum to rotate.

- Check of Drum Installation

When the Drum handle is let down after installing the Drum in the machine, the actuator of the Drum set switch is pressed by the handle, to indicate that the Drum is set in position.

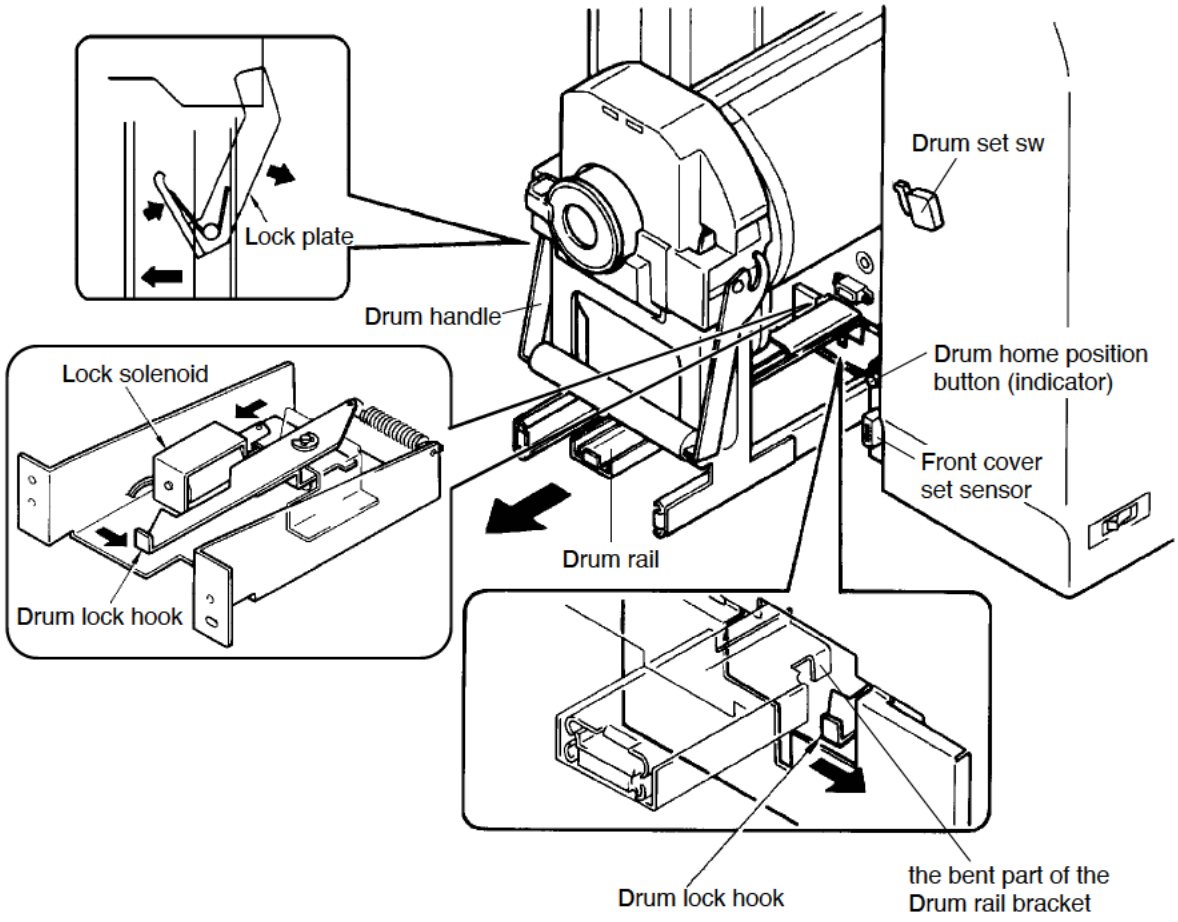
- Lock of Drum In Machine

The Drum is supported by the Drum holder which is mounted on the Drum rails.

When the Drum is in the machine, the bent part of the Drum rail bracket, which is attached under the center Drum rail, is caught by the Drum lock hook to prevent the Drum from being released out of the machine while the Drum is rotating.

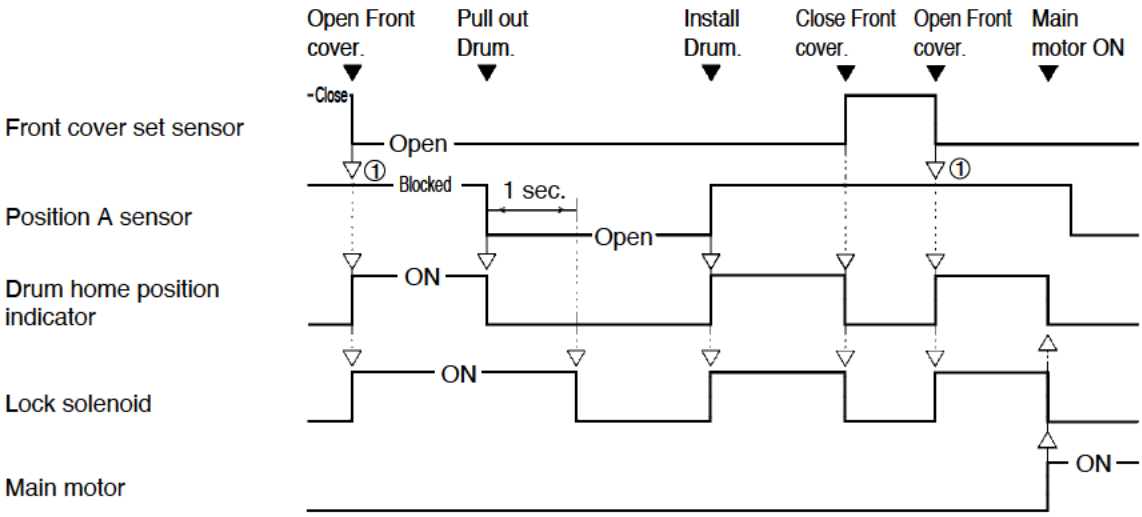
- Lock Release

When the light path of the Position A sensor is blocked by the Bracket B, that is when the Drum is at the home position, and the Front cover is opened, the Lock solenoid is activated ON to pull aside the Drum lock hook off the bent part of the Drum rail bracket, which allows the Drum to be released from the machine.



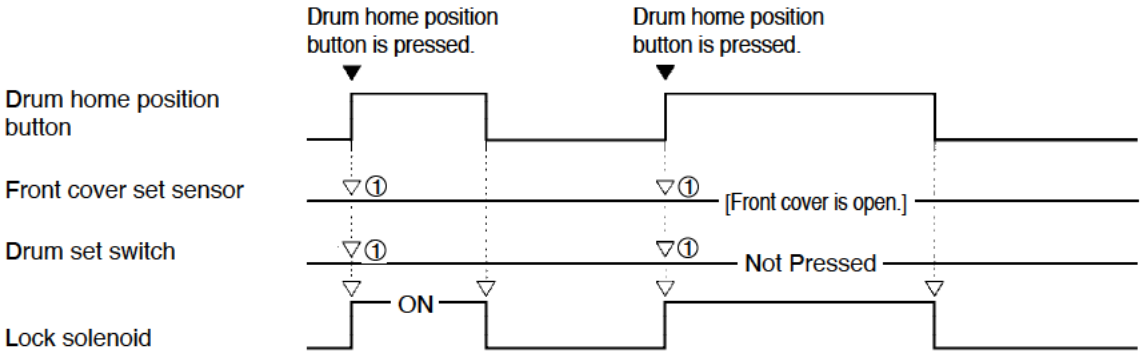
- Timing Chart -

Drum Locking System < In normal operation >



① The machine checks if the light path of the Position A sensor is blocked (if the Drum is at the home position).

Drum Locking System
< In case the Drum home position button is pressed with the Drum out of the machine >



① The machine checks that the Front cover set sensor doesn't detect the metal plate (the Front cover is open) and the Drum set switch is not pressed (the Drum is out of the machine).

4. Ink Supply System

- Rotation of Ink Driving Shaft and Squeegee Roller

When the Main shaft catch is rotated by the Main shaft, it rotates the Squeegee belt, which rotates the Ink driving shaft via the Ink driving shaft axis and the Squeegee roller via the Squeegee pulley.

[Note]

The Squeegee roller rotates clockwise while the Ink driving shaft rotates counter-clockwise.

- Ink Supply to the Inner Surface of Drum

When the Squeegee roller is rotated, ink is pressed through a narrow space above the roller and spread on it by the Doctor roller, which is attached close and in parallel to the Squeegee roller. The ink on the Squeegee roller is then transferred to the inner surface of the Drum.
The ink which does not pass through the narrow space and remains there forms a long and even bead, rolled by the rotating Ink driving shaft.

[Note]

The ink which is not transferred to the Drum surface on the Squeegee roller joins the ink bead in the Squeegee section.

- Ink Supply from Ink Bottle

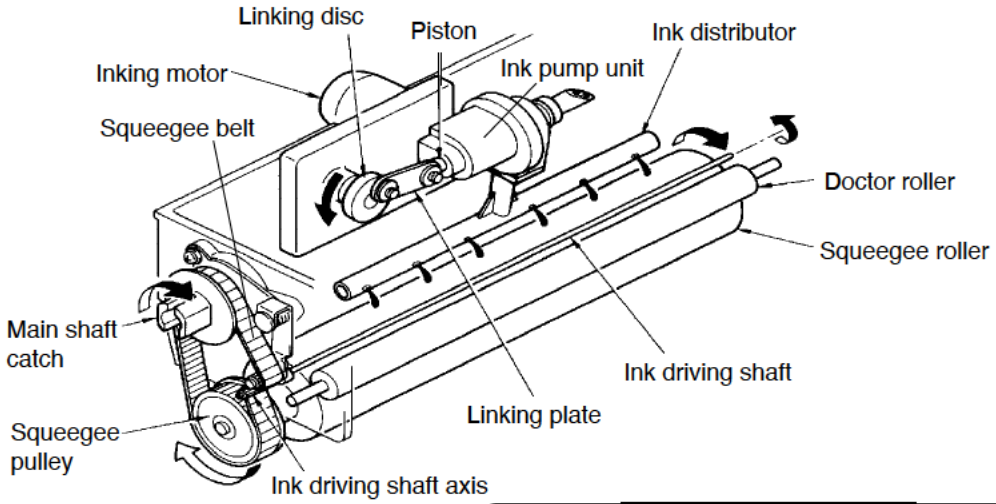
When ink is used in printing, the ink bead becomes thinner and exposes the tip of the Ink sensor attached to the Drum PCB, which activates the Inking motor, driving the piston in the Inking pump. This operation pumps ink out of an ink bottle through the nozzle of the Inking pump ans supplys ink into the Squeegee section through the holes of the Ink distributor.

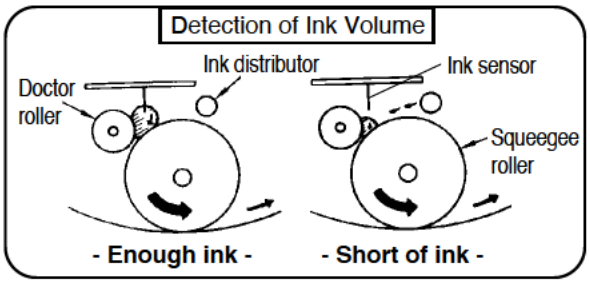
- Detection of Ink Volume

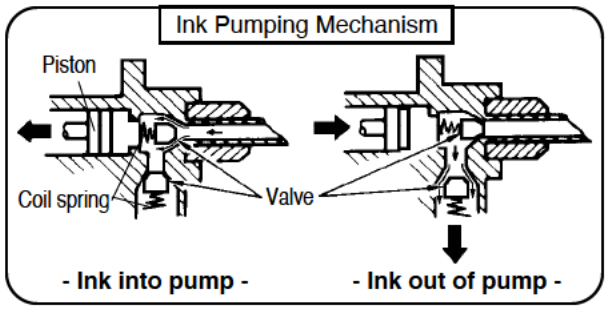
When the ink bead gets thicker due to ink supply, it gets contact with the Ink sensor, which deactivates the Inking motor to stop ink supply.

- Detection of Ink Overflow

If the ink bead gets so thick as to get contact with the Overflow sensor, which is a shorter pin than the Ink sensor and attached to the Drum PCB, the Inking motor is deactivated to prevent ink from overflowing the Squeegee section if it is operating and the error code **[E 04]** is displayed on the operation panel.

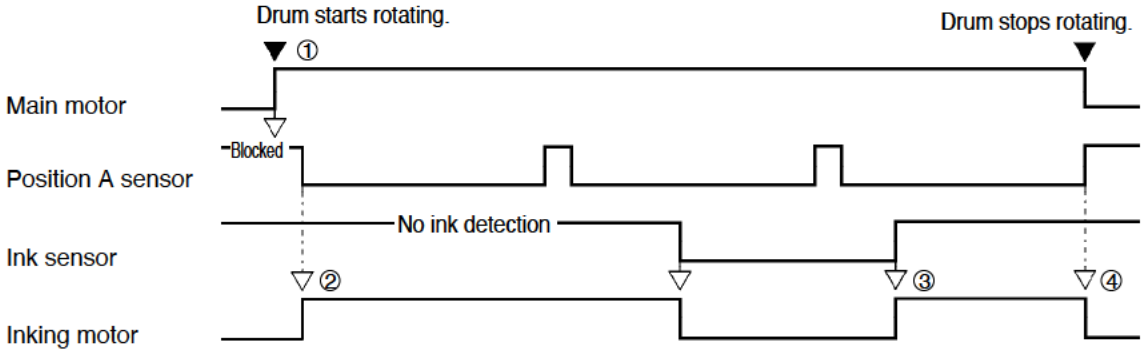




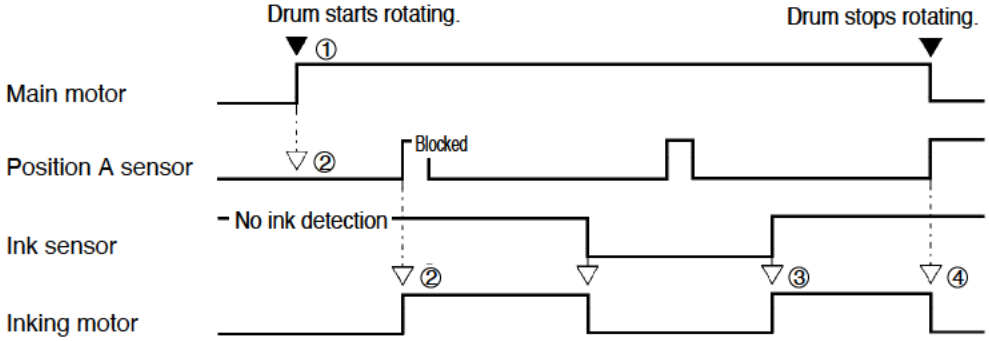


- Timing Chart -

Ink Supply System < when the Drum starts rotating from the Position A >



Ink Supply System < when the Drum starts rotating from any position but the Position A >



① If the Ink sensor is not in contact with ink when the Main motor starts operating, the status of the Position A sensor is checked.

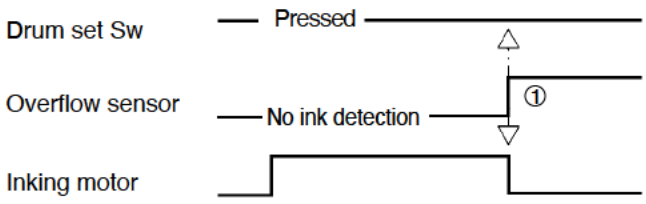
② As soon as the light path of the Position A sensor is opened or blocked (it is confirmed that the Drum is rotating), the Inking motor is activated.

③ If the Ink sensor gets out of contact with ink while the Main motor is operating, the Inking motor is activated.

④ When the Main motor stops operating, the Inking motor is deactivated.

* If the Ink sensor hasn't got contact with ink **within 20 seconds** after the Inking motor is activated, the machine assumes that no ink remains inside an ink bottle and the advice display **[REPLACE INK BOTTLE]** blinks on the operation panel.
When the Main motor stops operating before the built-in timer counts up 20 seconds to detect emptiness of an ink bottle, the timer is held.

Ink Overflow Detection Process



① If the Overflow sensor gets in contact with ink, the machine assumes that ink is about to overflow the Squeegee section and deactivates the Inking motor if it is in operation. In this case, the error code **[E 04]** is displayed on the operation panel.

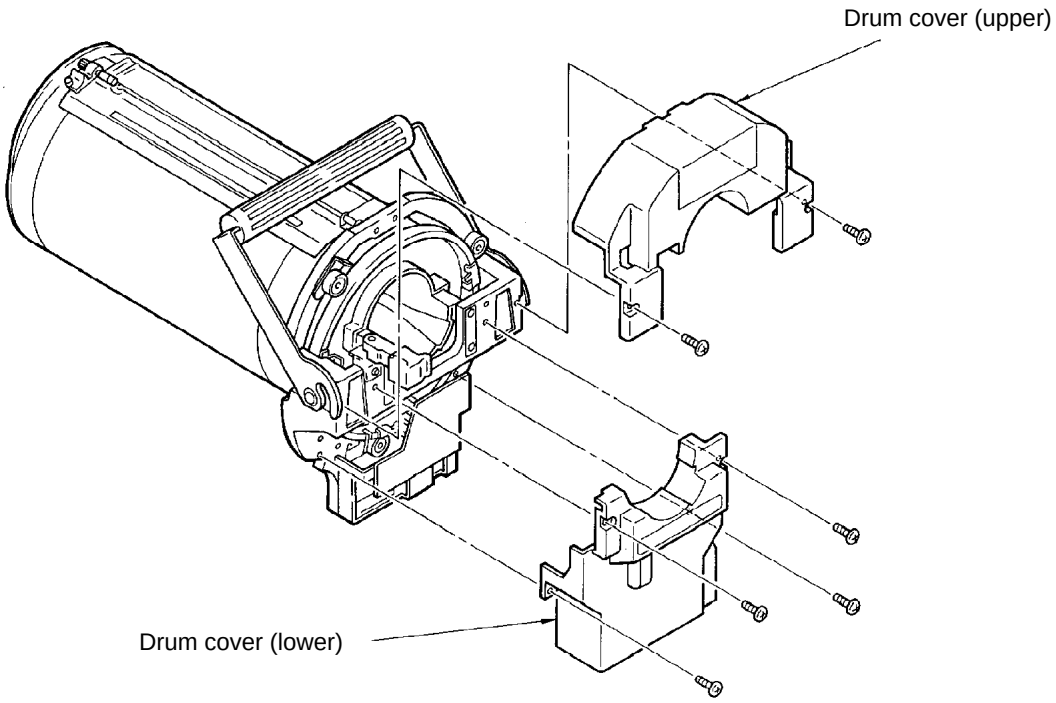
4. Drum Section

[Removal and Assembly]

1. Drum Cover

< Removal Procedure >

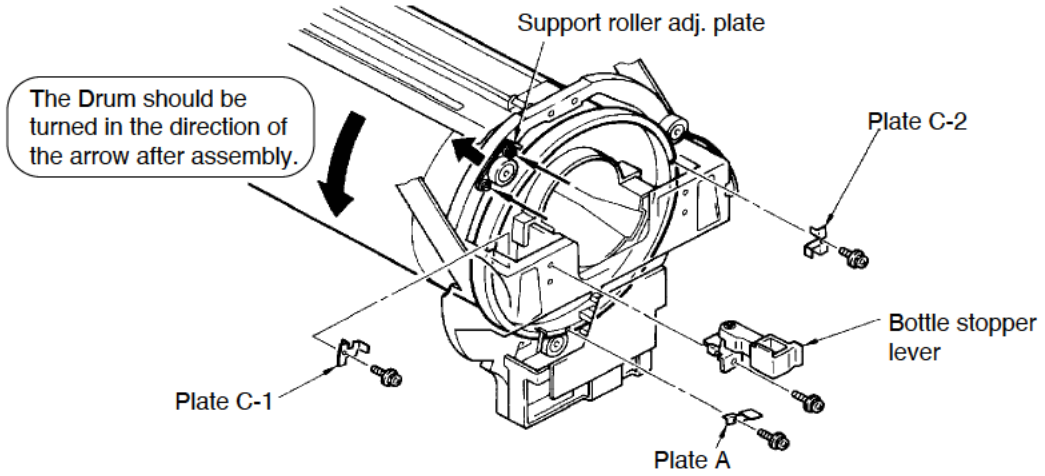
1. Remove the Drum from the machine, and remove an ink bottle from the Drum.
2. Remove two mounting screws on the Drum cover (upper), and remove the cover.
3. Remove four mounting screws on the Drum cover (lower), and remove the cover.



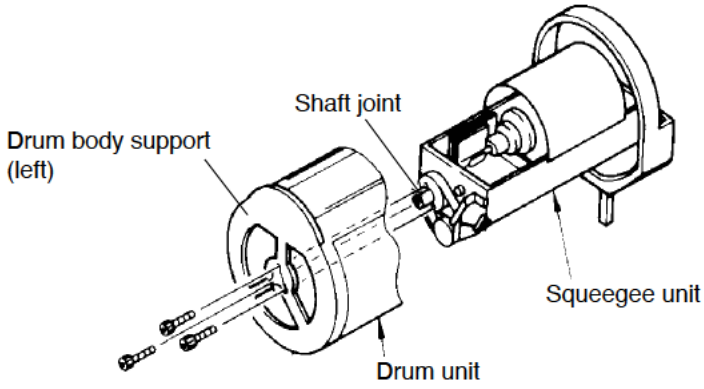
2. Squeegee Unit

< Removal Procedure >

1. Remove the Drum covers. (Refer to the previous page.)
2. Make a marking on the Drum where the Plate A is attached so that the plate can be reattached to the same position later, then remove the Plate A.
3. Remove both of the Plates C, i.e. Plate C-1 and Plate C-2.
   (To have access to their mounting screws, rotate the Drum.)
4. Remove the mounting screw on the Bottle stopper lever, and remove the lever.
5. Loosen two mounting screws on the Support roller adj. plate and slide the Support roller away from the Drum body support (right).


Support roller adj. plate
The Drum should be turned in the direction of the arrow after assembly.
Plate C-2
Bottle stopper lever
Plate C-1
Plate A

6. Remove three Hexagon socket head screws securing the Squeegee unit to the Drum body support (left), and remove the Squeegee unit from the Drum.



- Precautions In Assembly -

- The position of the Ink blocking plates on both ends of the Squeegee unit should be roughly adjusted before assembling the Squeegee unit into the Drum unit. (Refer to the page IV-23.)
- The narrower slit of the Shaft joint should point up when placing the Squeegee unit into the Drum unit.
- Confirm that the Support roller is in contact with the Drum body suppport (right) 1before tightening the mounting screws on the Support roller adj. plate.
- The attachment position of the Plate C-2 is different depending on the Drum size. Make sure to attach the Plate C-2 to the same position as before removal.
- Return the Plate A to the pre-marked position on the Drum.
  After assembly, check that the Plate A is attached correctly. (Refer to the page IV-24.)

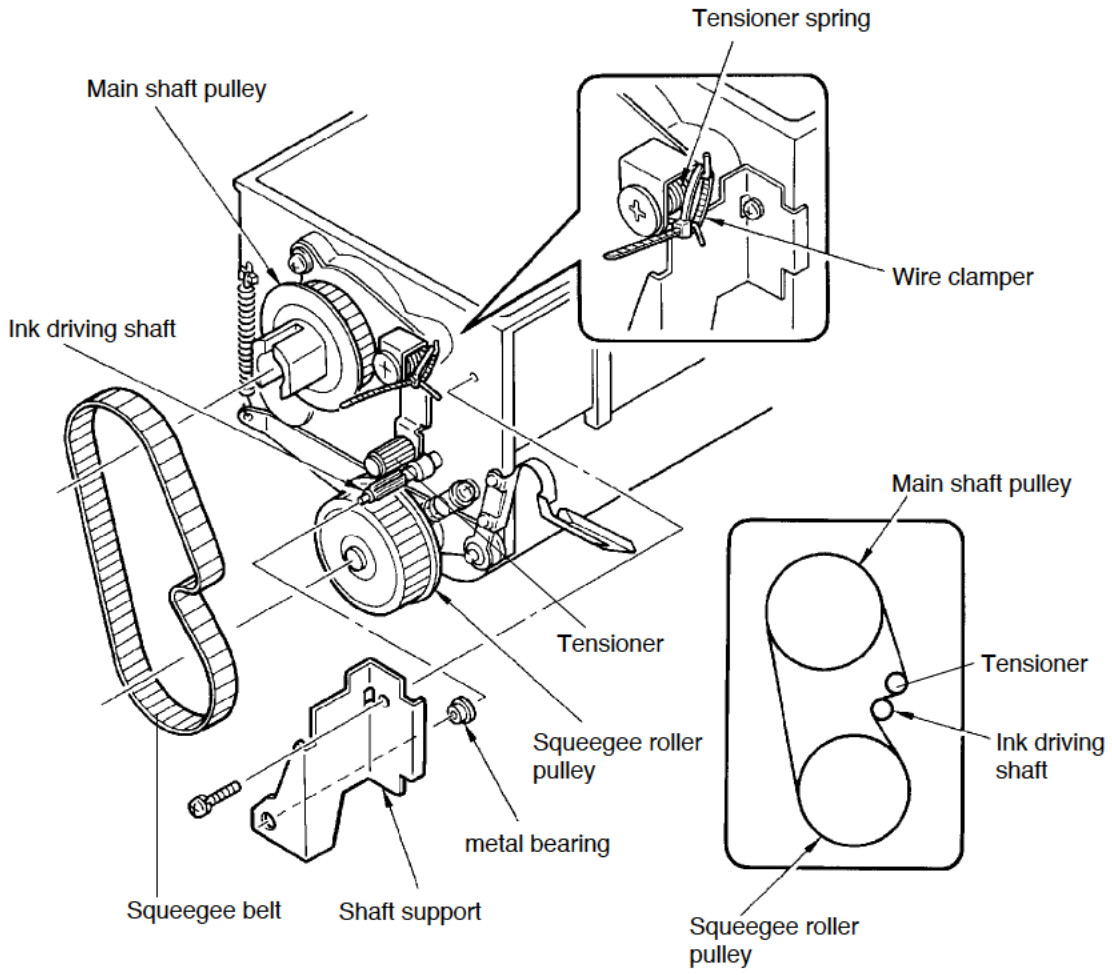
3. Squeegee Belt

< Removal Procedure >

1. Remove the Squeegee unit from the Drum, referring to the previous page.
2. Wind a wire clamper on the Tensioner spring to prevent the Tensioner from giving tension on the Squeegee belt as shown in the figure below.
3. Remove the mounting screw on the Shaft support, and remove the Shaft support and a metal bearing at the end of the Ink driving shaft.
4. Remove the Squeegee belt from the pulleys.

- Precautions In Assembly -

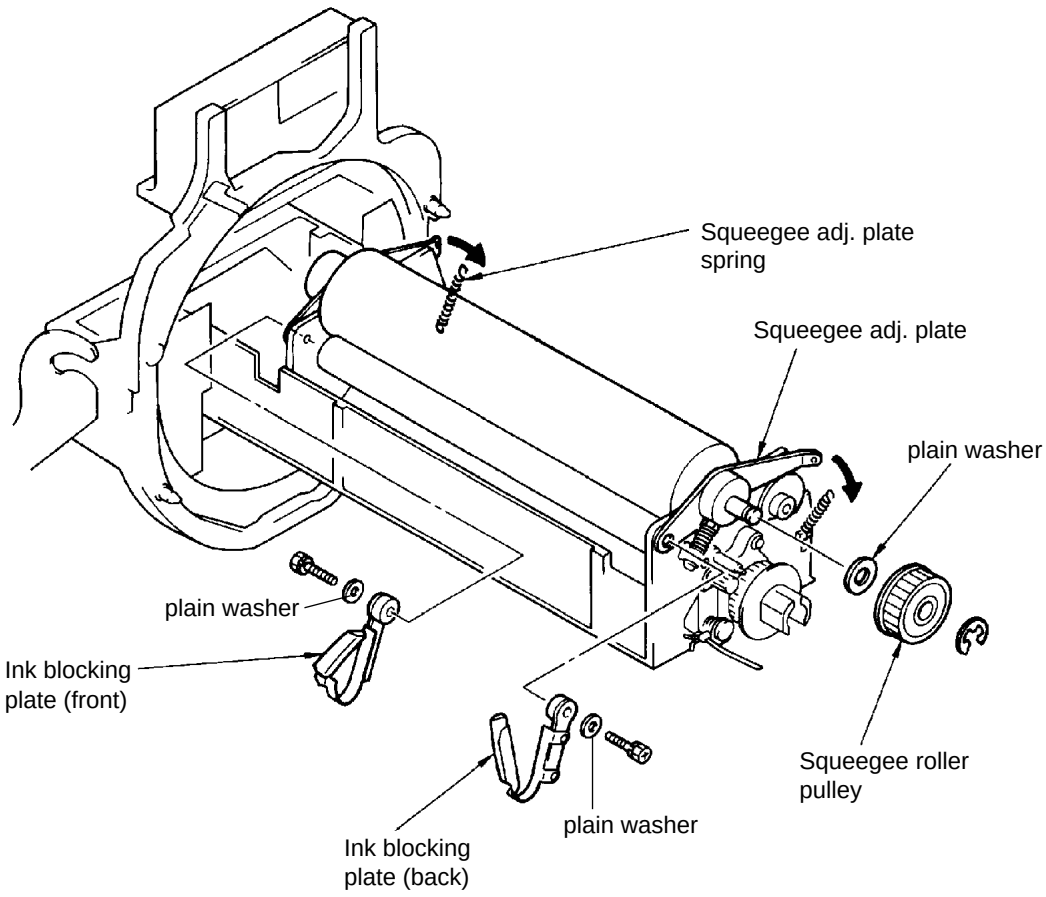
- Confirm that the securing screw (allen screw) in the Main shaft pulley is not loose before putting the belt on it.
- Make sure to put a metal bearing on the end of the Ink driving shaft.
- Make sure to cut the wire clamper wound on the Tensioner spring after assembly.



4. Squeegee Roller

< Removal Procedure >

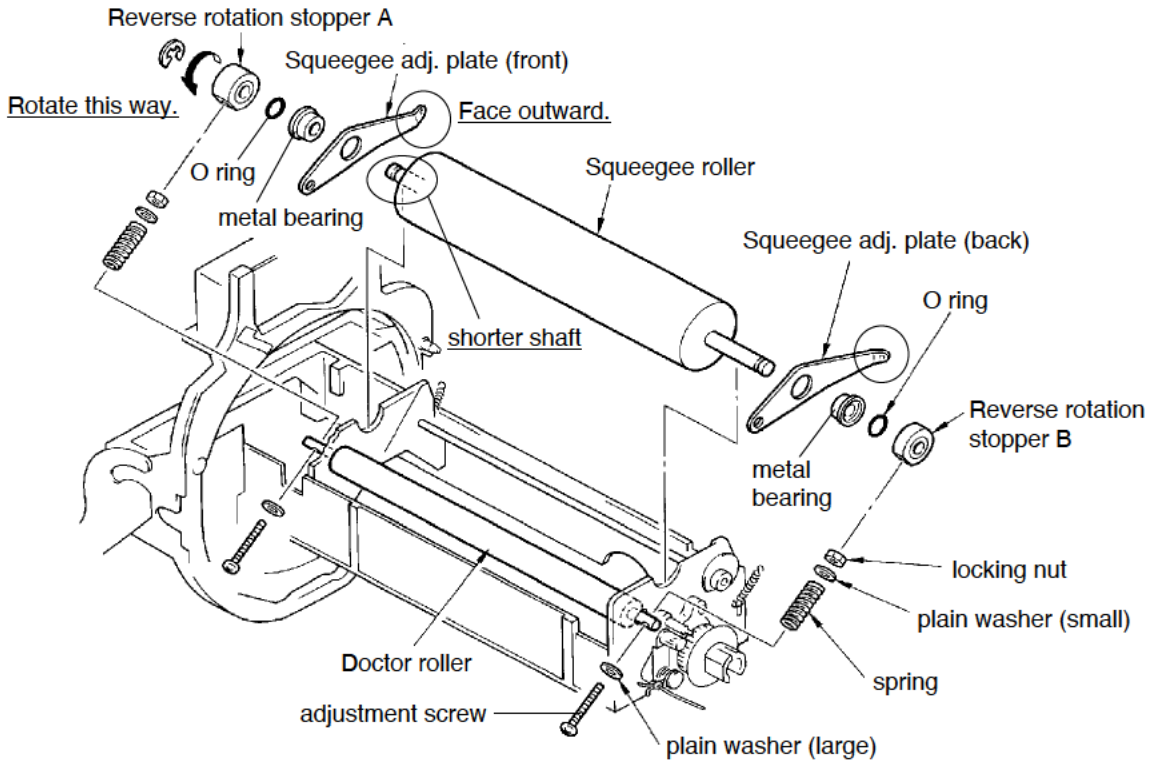
1. Remove the Squeegee unit from the Drum. (Refer to the page IV-10.)
2. Remove the Squeegee belt from the pulleys, referring to the previous page.
3. Remove an E ring at one end of the Squeegee roller shaft, and remove the Squeegee roller pulley and a plain washer behind it.
4. Remove the securing screws on the Ink blocking plates (front and back), and remove the plates.
   [IMPORTANT]
   Don't lose the plain washer put on the securing screw.
5. Unhook the Squeegee adj. plate springs from the Squeegee adj. plates (front and back).



6. Loosen the locking nuts on the adjustment screws securing the Reverse rotation stoppers (A and B) and remove the adjustment screws from the Reverse rotation stoppers.
   Remove the locking nuts from the adjustment screws and pull out the screws from the holes on both ends of the Doctor roller.
   [IMPORTANT]
   Don't lose the spring and plain washers put on the adjustment screw in removal.
7. Hold up the Squeegee roller and take it out of the Squeegee unit.
8. Remove an E ring at the other end of the Squeegee roller shaft and slide the following parts off the Squeegee roller shaft: Reverse rotation stoppers (A and B), O rings, metal bearings and Squeegee adj. plates (front and back).

- Precautions In Assembly -

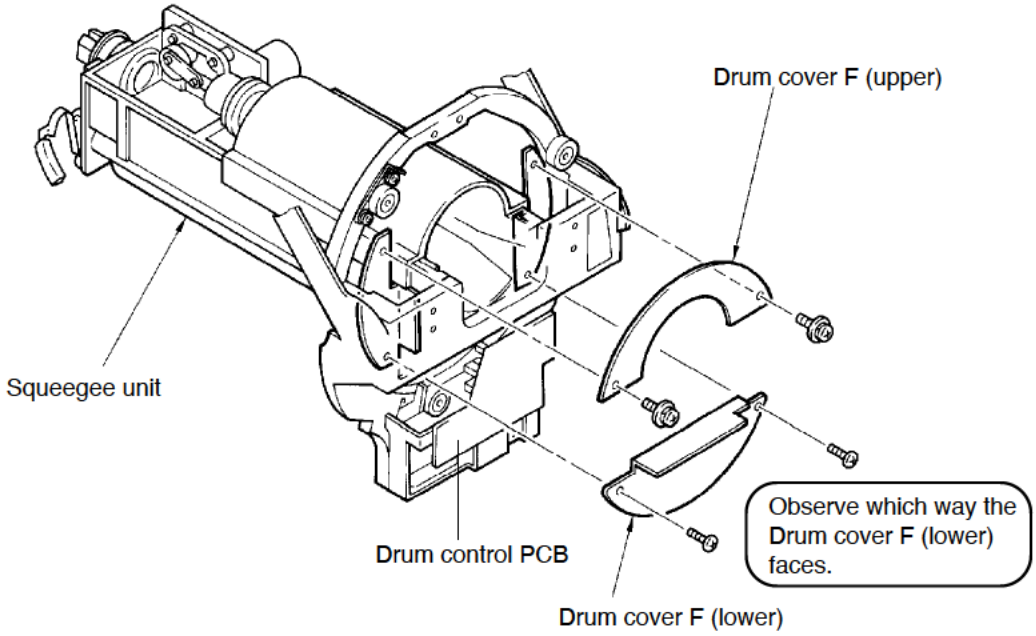
- Be careful not to attach the Squeegee adj. plates (front and back) and Reverse rotation stoppers (A and B) to a wrong end of the Squeegee roller shaft because the length of the shaft is different at both ends.
  - The bent part of the Squeegee adj. plate should face outward.
  - The Reverse rotation stopper A (thicker one) should be put on the shorter shaft.
- Make sure to insert an O ring between a metal bearing and the Reverse rotation stopper.
- Confirm that the Reverse rotation stopper A rotates on the shaft in the arrow-indicating direction as shown in the figure below before securing it with the adjustment screw because the Reverse rotation stopper A has an one-way clutch built-in.
- Make sure to put washers and a spring on the adjustment screw as indicated in the figure below.
- Make sure to put a plain washer on the shaft before the Squeegee roller pulley.
- Confirm that the Squeegee roller pulley rotates on the shaft in the same direction as does the Reverse rotation stopper A before putting an E ring on the shaft because the Squeegee roller pulley has an one-way clutch built-in. (The collar of the pulley should face inside.)
- Always adjust the Squeegee gap after assembly. (Refer to the page IV-21.)



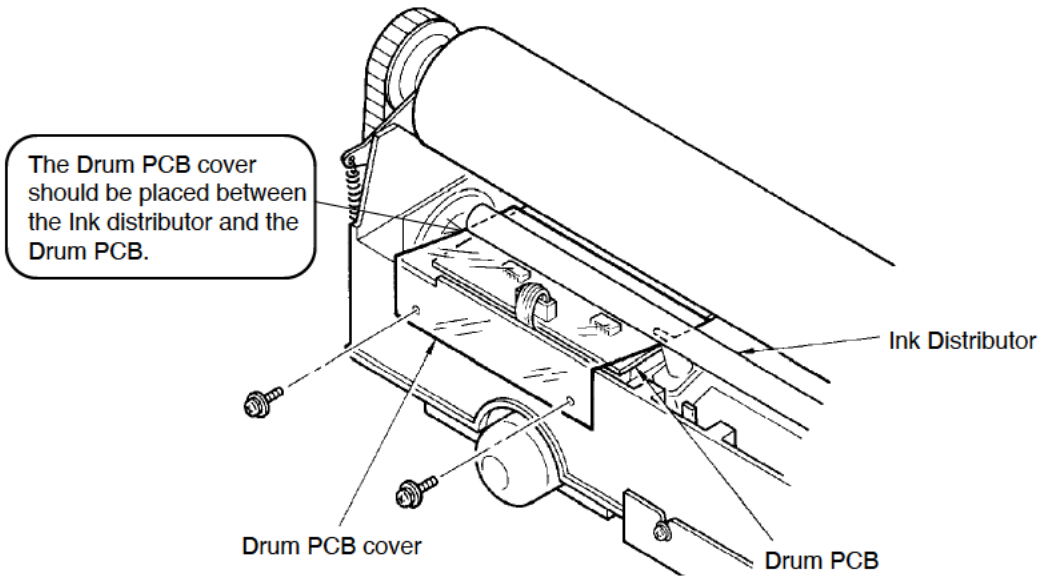
5. Ink Pump Unit

< Removal Procedure >

1. Remove the Squeegee unit from the Drum, referring to the page IV-10.
2. Remove the Drum cover F (upper) and Drum cover F (lower).
3. Disconnect the connector for the Inking motor (**CN4**) on the **Drum control PCB**, and cut off the wire clamper binding the wires.



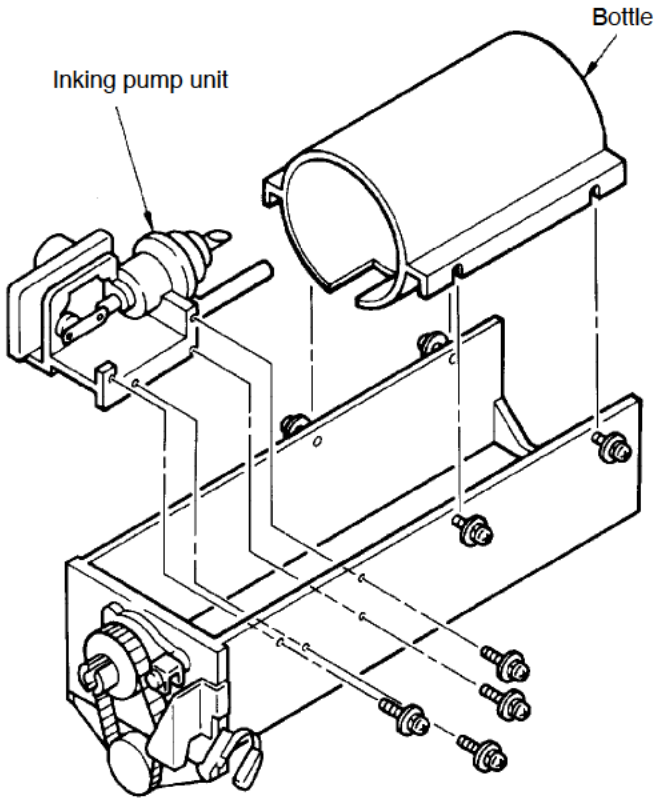
4. Turn over the Squeegee unit and remove the Drum PCB cover (clear plastic sheet) by removing two mounting screws.
   Disconnect the connector on the Drum PCB.
   [IMPORTANT]
   Be careful not to bend the Ink sensor and Overflow sensor on the Drum PCB. In case they are bent, reform them in the way they stand upright on the Drum PCB.

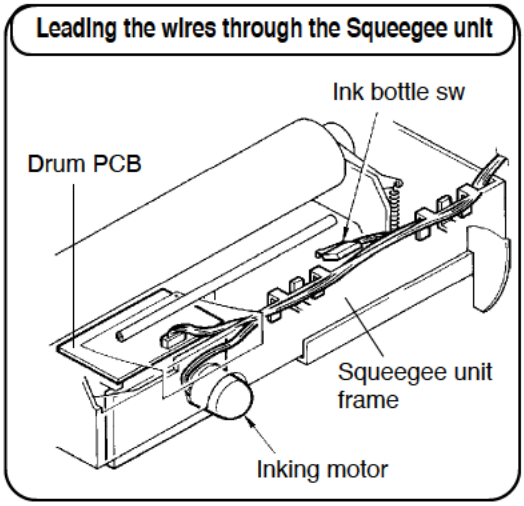


5. Bring the wire harness of the Inking motor, i.e. red & blue wires, towards the motor.
   Remove four mounting screws of the Inking pump unit and take the unit out of the Squeegee unit, taking care not to smudge the wires with ink.

- Precautions In Assembly -

- Make sure to place the Drum PCB cover between the Drum PCB and the Ink distributor as shown in the figure on the previous page.
- Lead the wires coming out of the Inking motor and Drum PCB through the hooks on the frame of the Squeegee unit as shown in the figure below.





6. Ink Bottle Sw

< Removal Procedure >

1. Remove the Squeegee unit from the Drum. (Refer to the page IV-10.)
2. Remove the Drum cover F (upper) and Drum cover F (lower), referring to the previous page.
3. Disconnect the connector for the Ink bottle switch (**CN5**) on the **Drum control PCB**, and cut off the wire clamper binding the wires.
4. Bring the wire harness of the Ink bottle sw, i.e. blue wires, towards the switch.
   Remove four mounting screws on the Bottle guide and take it out of the Squeegee unit, taking care not to smudge the wires with ink.
5. Remove two mounting screws on the Ink bottle sw, and remove the switch from the bracket.

- Precautions In Assembly -

- Lead the wires of the Ink bottle sw through the hooks on the frame of the Squeegee unit as shown in the figure above.

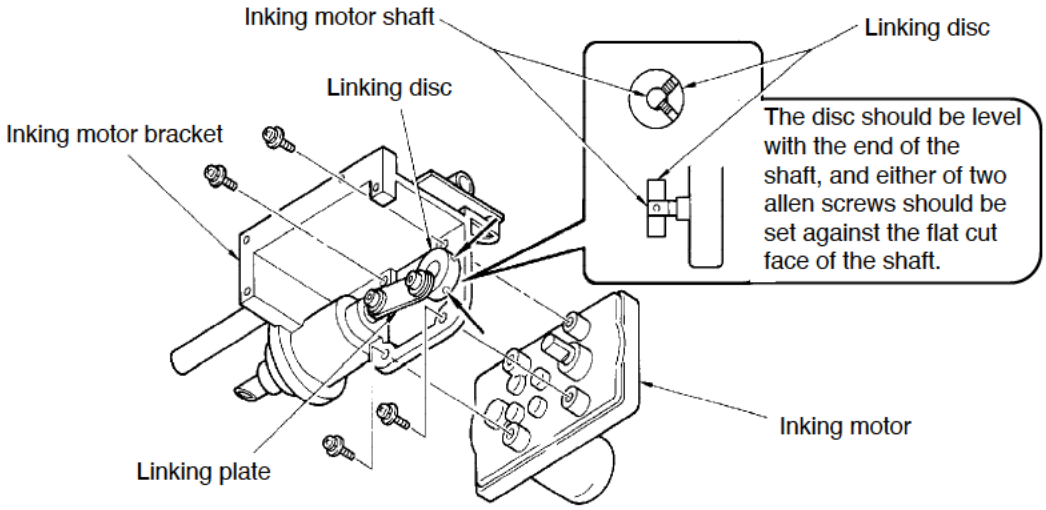
7. Inking Motor

< Removal Procedure >

1. Remove the Inking Pump Unit from the Squeegee unit, referring to the page IV-14.
2. Loosen two allen screws securing the Linking disc on the shaft of the Inking motor.
3. Remove four mounting screws of the Inking motor and remove the motor.

- Precautions In Assembly -

- The Linking disc should be secured on a level with the end of the Inking motor shaft. Either of two allen screws in the disc should be set against the flat cut face of the shaft.


Inking motor shaft
Linking disc
Linking disc
Inking motor bracket
The disc should be level with the end of the shaft, and either of two allen screws should be set against the flat cut face of the shaft.
Inking motor
Linking plate

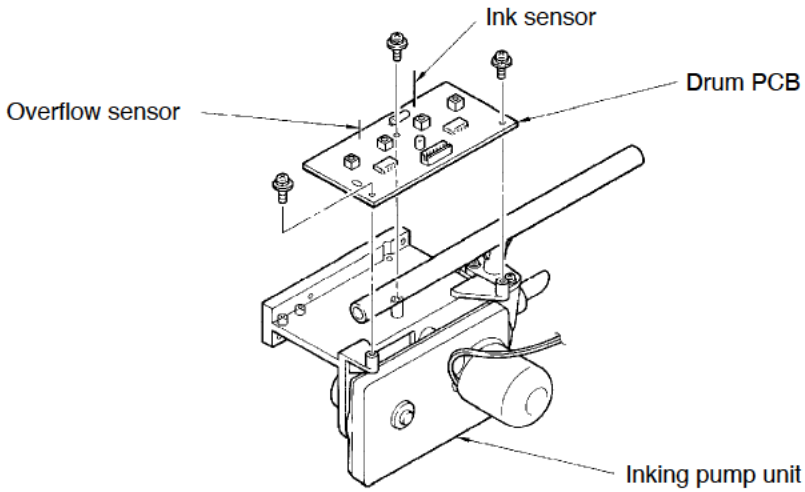
8. Drum PCB

< Removal Procedure >

1. Remove the Inking Pump Unit from the Squeegee unit, referring to the page IV-14.
2. Remove three mounting screws on the Drum PCB, and remove the PCB.

- Precautions In Assembly -

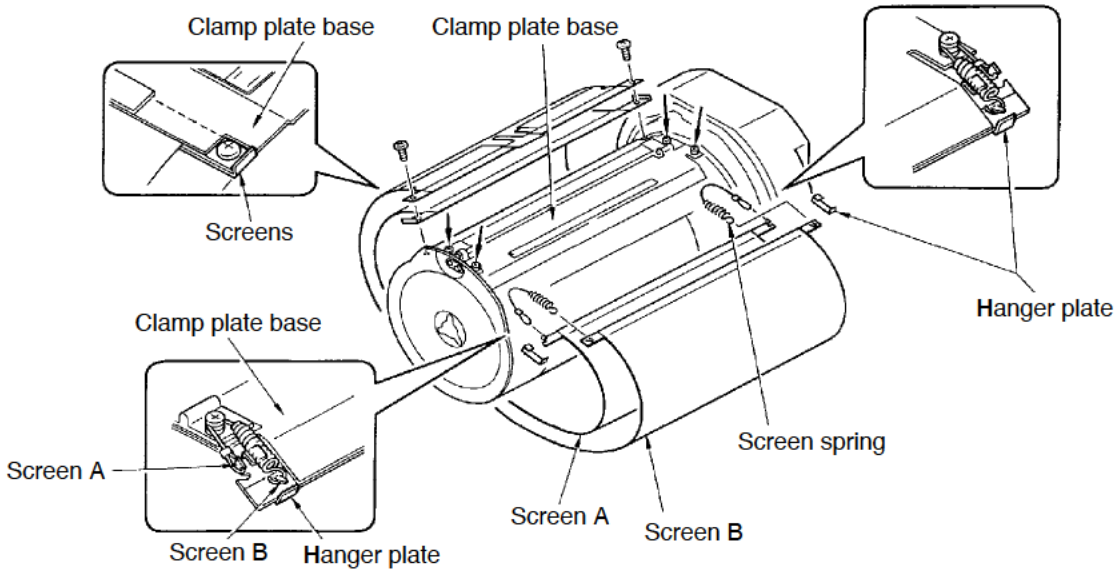
- The Ink sensor and Overflow sensor should be set upright on the Drum PCB.



9. Screens

< Removal Procedure >

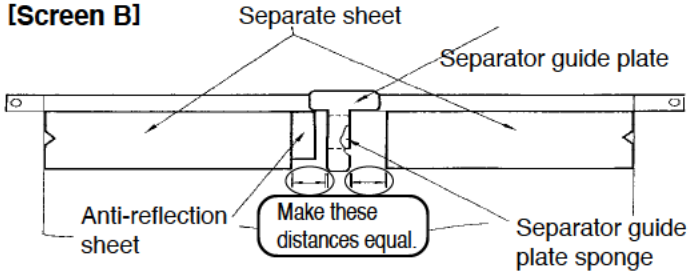
1. Put a blank master on the Drum by the confidential operation and pull out the Drum from the machine, keeping the Drum installed on the Drum holder.
2. Remove the Screen springs from the hooks on both sides of the Screens.
3. Loosen four mounting screws on the Clamp plate base.
4. Remove two securing screws on the Screens and slide out the attachment plates (metal) at both edges of the Screens from under the Clamp plate base.
   [IMPORTANT]
   Be careful not to drop the Hanger plates when sliding out the attachment plate at the tail edge.
5. Peel the Screens off the Drum body, holding the attachment plates at both edges.
   [IMPORTANT]
   Be careful not to crease the Screens when peeling them off the Drum body.



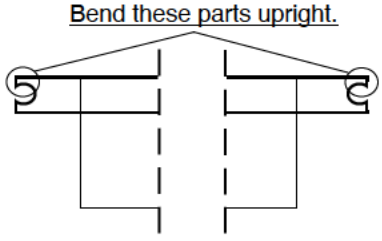
- Precautions In Assembly -

- Take care not to crease the Screens when handling them.
- Paste the following parts on the Screen B as indicated in the figure below before assembly: Separate sheets, Anti-reflection sheet and Separator guide plate.
- Bend upright the parts at the tail edge of the Screen A which are indicated in the figure below before assembly.
- Make sure to hook the Hanger plates on the attachment plate of the Screen A from the bottom, and the Screen springs from outside to inside as indicated in the figure above.
- After securing the Clamp plate base, always confirm that the Clamp plate can be smoothly opened and closed by hand.

[Screen B]



[Screen A]



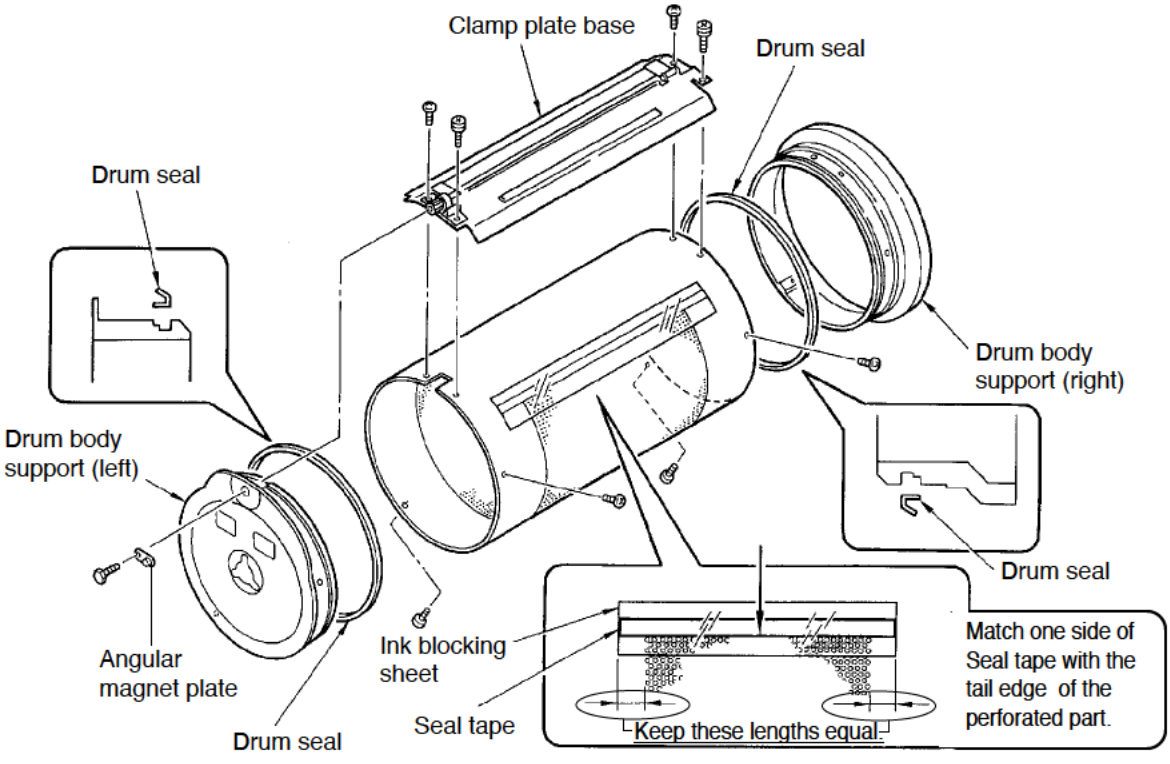
10. Drum Body

< Removal Procedure >

1. Remove the Screens from the Drum, referring to the previous page.
2. Unload the Drum from the Drum holder if it is on the holder.
3. Remove the Squeegee unit from the Drum, referring to the page IV-10.
4. Remove the mounting screw on the Angular magnet plate, and remove the plate.
5. Remove four mounting screws on the Clamp plate base and remove it.
6. Remove the respective two securing screws of the Drum body supports (left and right), and remove the Drum body supports from the Drum body.

- Precautions In Assembly -

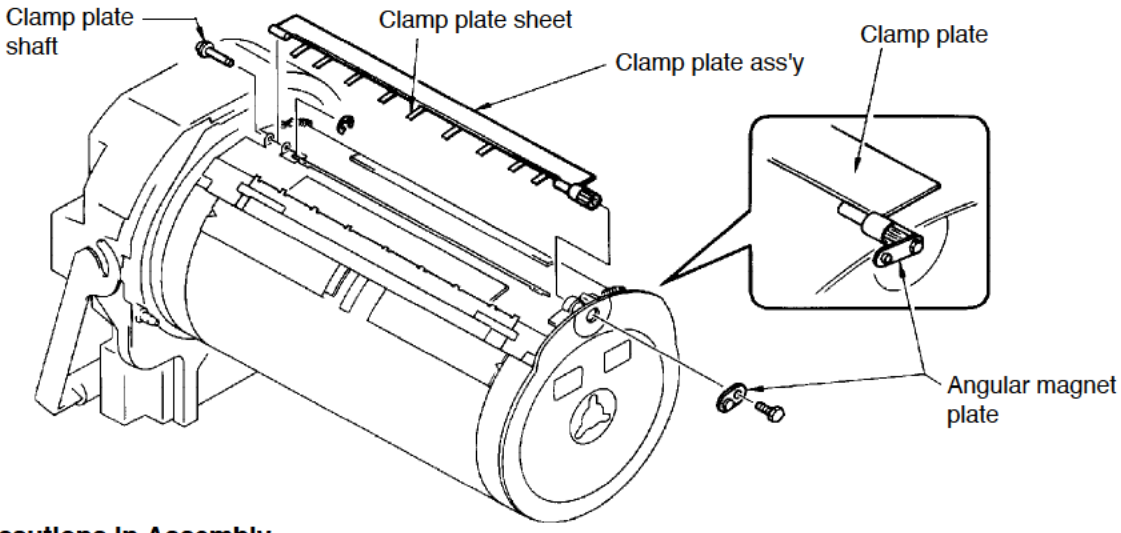
- The Drum seal should be put on the Drum body supports in the way described in the figures below.
  Always put grease on the Drum seal before assembly to allow smooth insertion of the Drum body supports into the Drum body.
- Make sure to secure the Drum body supports to the Drum body, pulling them outward.
- Attach the Ink blocking sheet and Seal tape onto the Drum body as shown in the figure below.
- Attach the Angular magnet plate so that the magnet can be placed on the opposite side of the Clamp plate.
  After assembly, confirm that the Angular magnet plate is placed on the same level in both cases when the Clamp plate is open and when it is closed.



11. Clamp Plate Ass'y

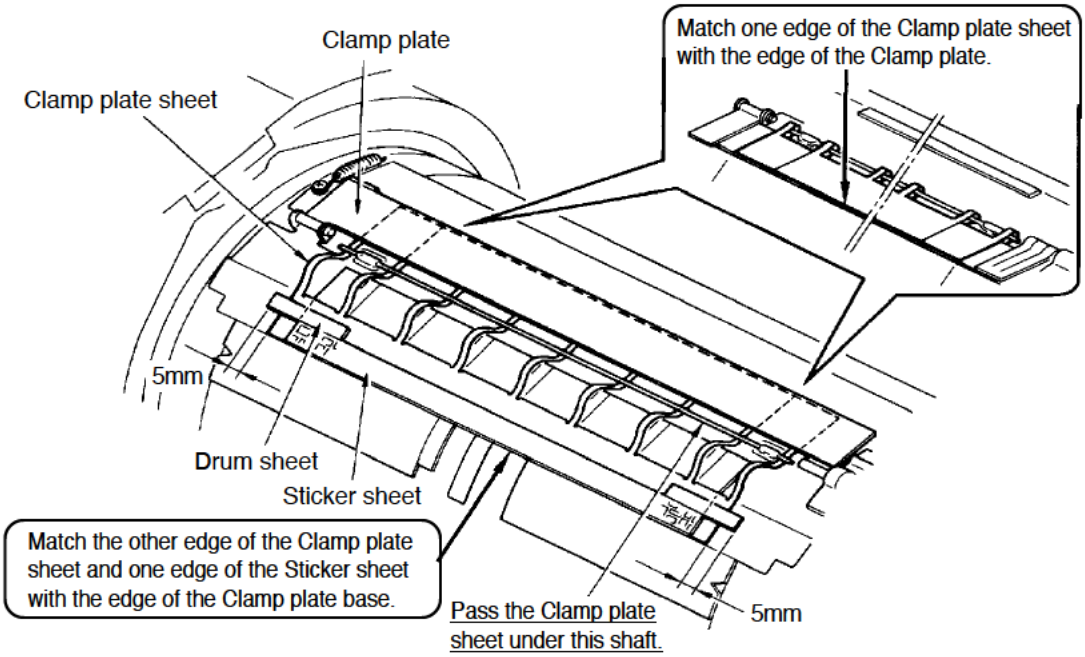
< Removal Procedure >

1. Remove the Drum from the machine.
2. Remove the mounting screw on the Angular magnet plate, and remove the plate.
3. Remove an E ring at one end of the Clamp plate shaft, and pull out the shaft.
4. Cut the strips of the Clamp plate sheet.
5. Remove the Clamp plate ass'y, leading the Clamp plate gear through the Compensator.



- Precautions In Assembly -

- Attach the following parts on the Drum and Clamp plate ass'y as indicated in the figure below: Clamp plate sheet, Drum sheets and Sticker sheet.
- Attach the Angular magnet plate so that the magnet can be placed on the opposite side of the Clamp plate. After assembly, confirm that the Angular magnet plate is placed on the same level in both cases when the Clamp plate is open and when it is closed.


Clamp plate
Clamp plate sheet
Match one edge of the Clamp plate sheet with the edge of the Clamp plate.
5mm
Drum sheet
Sticker sheet
Match the other edge of the Clamp plate sheet and one edge of the Sticker sheet with the edge of the Clamp plate base.
Pass the Clamp plate sheet under this shaft.
5mm

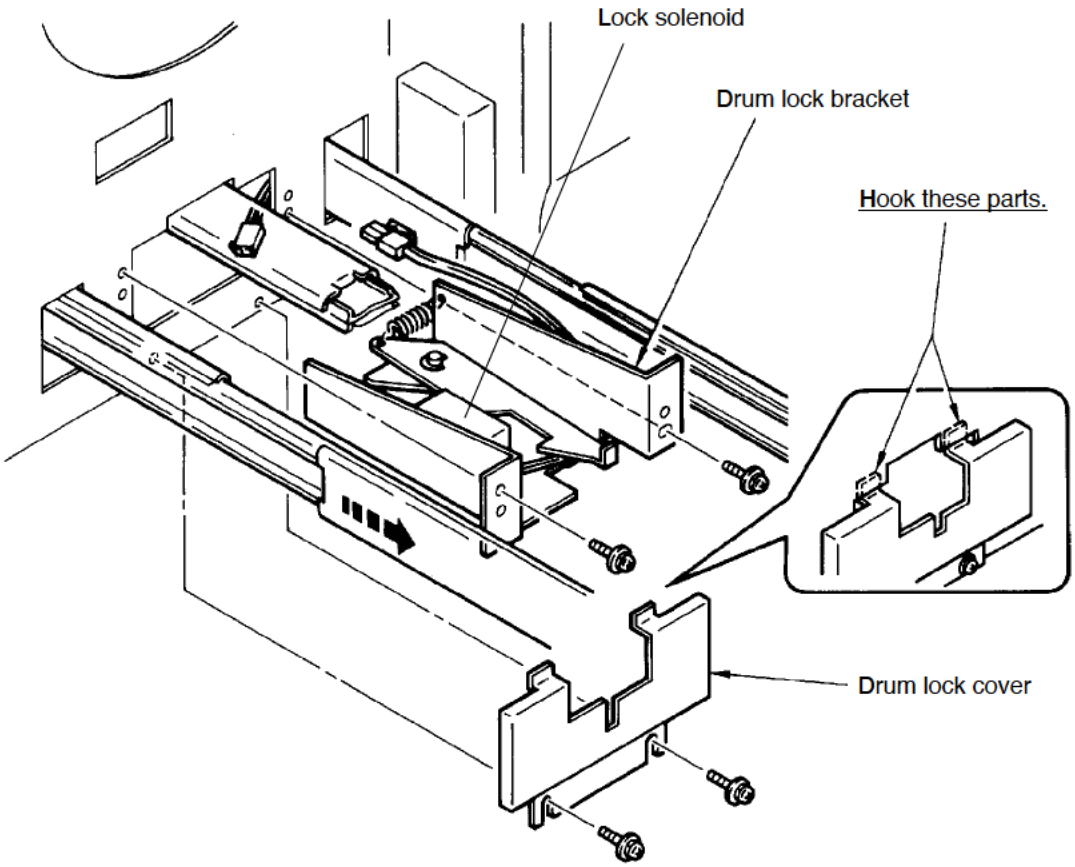
12. Lock Solenoid

< Removal Procedure >

1. Take out the Drum from the machine and turn OFF the power.
2. Remove the Front right cover and Suction cover plate. (Refer to the page III-8.)
3. Cut the wire clamper holding the wires of the Lock solenoid below the Power supply PCB and disconnect the connector of the Lock solenoid.
4. Remove two mounting screws on the Drum lock cover, and remove the cover.
5. Remove two mounting screws on the Drum lock bracket and pull out the bracket, leading the wires and connector through the hole on the machine side frame.
6. Remove two mounting screws of the Lock solenoid, and remove the solenoid from the bracket.

- Precautions In Assembly -

- Make sure to match the positioning bosses on the Drum lock bracket with the holes of the machine frame.
- Make sure to secure the wires of the Lock solenoid to prevent the Drum rails from catching them.
- Make sure to insert the hooks of the Drum lock cover inside the machine frame as shown in the figure below.



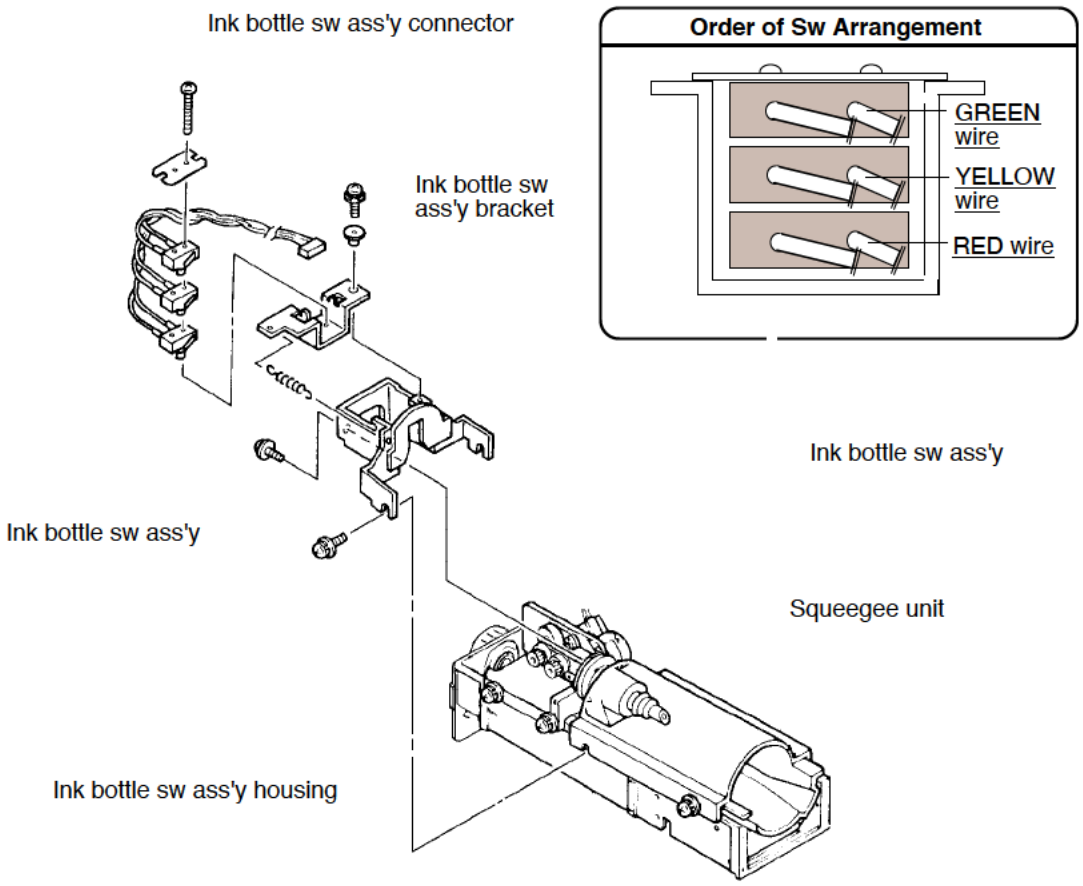
13. Ink Bottle Sw Ass'y <GR>

< Removal Procedure >

1. Remove the Squeegee unit from the Drum, referring to the page IV-10.
2. Disconnect the connector of the Ink bottle sw ass'y, remove the mounting screw of the Ink bottle sw ass'y housing and remove the housing with the Ink bottle sw ass'y attached.
3. Remove a spring and the mounting screw on the Ink bottle sw ass'y bracket and separate the bracket from the housing.
4. Remove two mounting screws of the Ink bottle sw ass'y and remove the switch ass'y from the bracket.

- Precautions In Assembly -

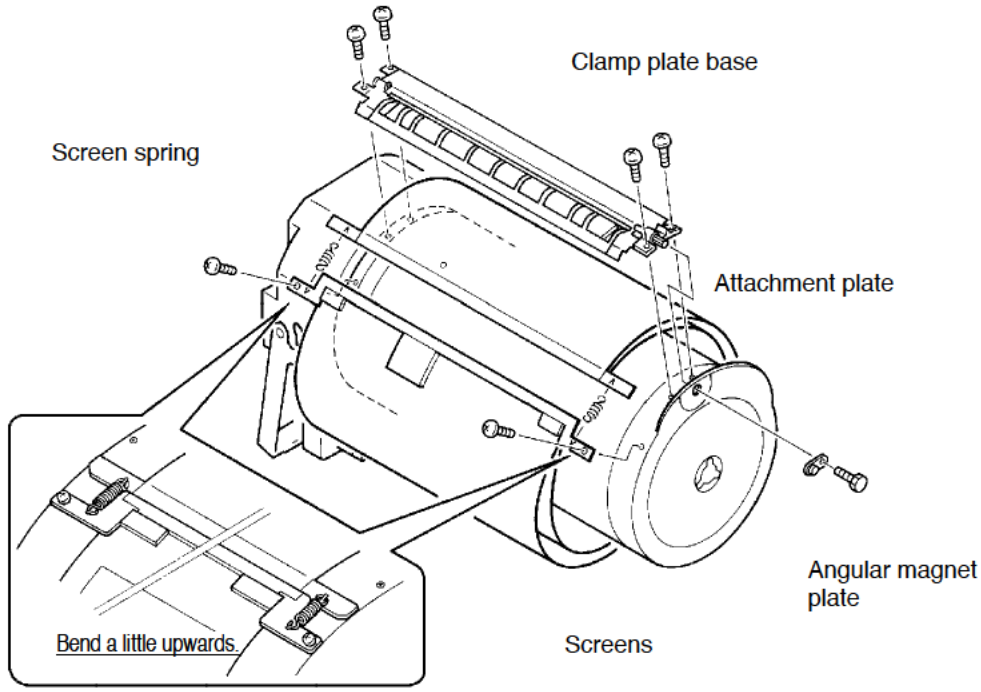
- Make sure that the Ink bottle switches are arranged in the correct order, referring to the figure below. If they are wrongly arranged, the operation will be prevented with the message indicating the installation of a wrong type of ink cartridge.



14. Screens <GR-A3/Ledger>

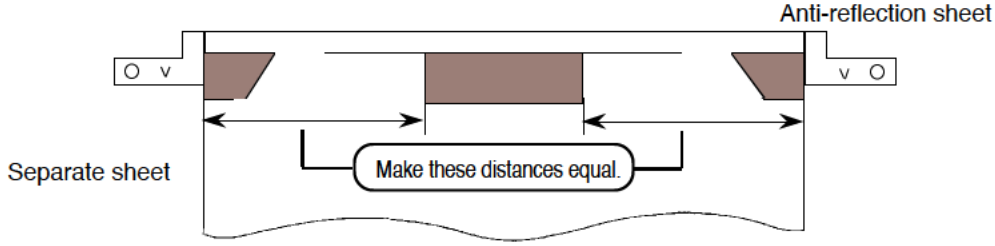
< Removal Procedure >

1. Put a blank master on the Drum by the confidential operation and pull out the Drum from the machine, keeping the Drum installed on the Drum holder.
2. Remove the mounting screw on the Angular magnet plate and remove the plate.
3. Remove four mounting screws on the Clamp plate base and remove it.
4. Remove the Screen springs from the hooks on both sides of the Screens.
5. Remove two securing screws on the Screens and peel the Screens off the Drum body, holding the attachment plates at both edges.
   [IMPORTANT]
   Be careful not to crease the Screens when peeling them off the Drum body.



- Precautions In Assembly -

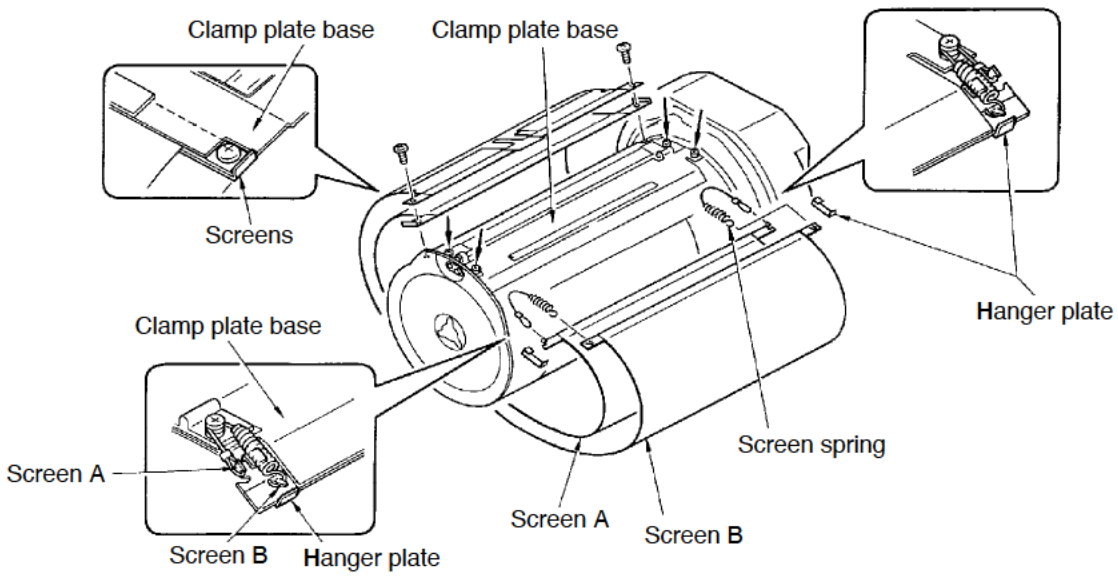
- Take care not to crease the Screens when handling them.
- Paste the following parts on the Screen as indicated in the figure below before assembly: Separate sheets and Anti-reflection sheet.
- Bend the parts of the attachment plates at both edges of the Screens which are indicated in the figure above, a little upwards before assembly.
- After securing the Clamp plate base, always confirm that the Clamp plate can be smoothly opened and closed by hand.
- Attach the Angular magnet plate so that the magnet can be placed on the opposite side of the Clamp plate.



15. Screens <GR-B4/A4/Legal>

< Removal Procedure >

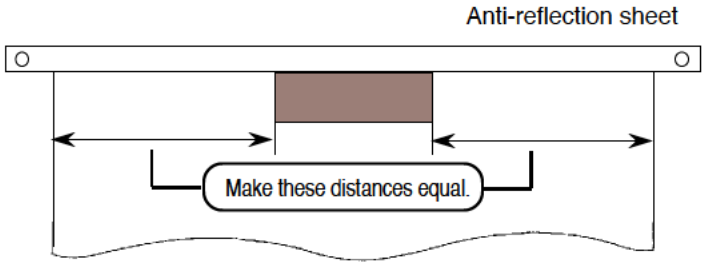
1. Put a blank master on the Drum by the confidential operation and pull out the Drum from the machine, keeping the Drum installed on the Drum holder.
2. Remove the Screen springs from the hooks on both sides of the Screens.
3. Loosen four mounting screws on the Clamp plate base.
4. Remove two securing screws on the Screens and slide out the attachment plates (metal) at both edges of the Screens from under the Clamp plate base.
   [IMPORTANT]
   Be careful not to drop the Hanger plates when sliding out the attachment plate at the tail edge.
5. Peel the Screens off the Drum body, holding the attachment plates at both edges.
   [IMPORTANT]
   Be careful not to crease the Screens when peeling them off the Drum body.



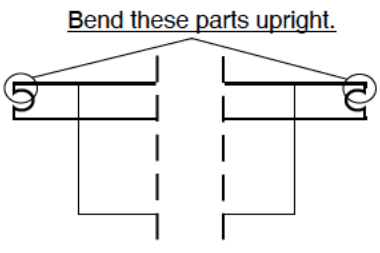
- Precautions In Assembly -

- Take care not to crease the Screens when handling them.
- Paste the Anti-reflection sheet on the Screen B as indicated in the figure below before assembly.
- Bend upright the parts at the tail edge of the Screen A which are indicated in the figure below before assembly.
- Make sure to hook the Hanger plates on the attachment plate of the Screen A from the bottom, and the Screen springs from outside to inside as indicated in the figure above.
- After securing the Clamp plate base, always confirm that the Clamp plate can be smoothly opened and closed by hand.

[Screen B]



[Screen A]



4.Drum Section

[Adjustment]

1. Squeegee Gap

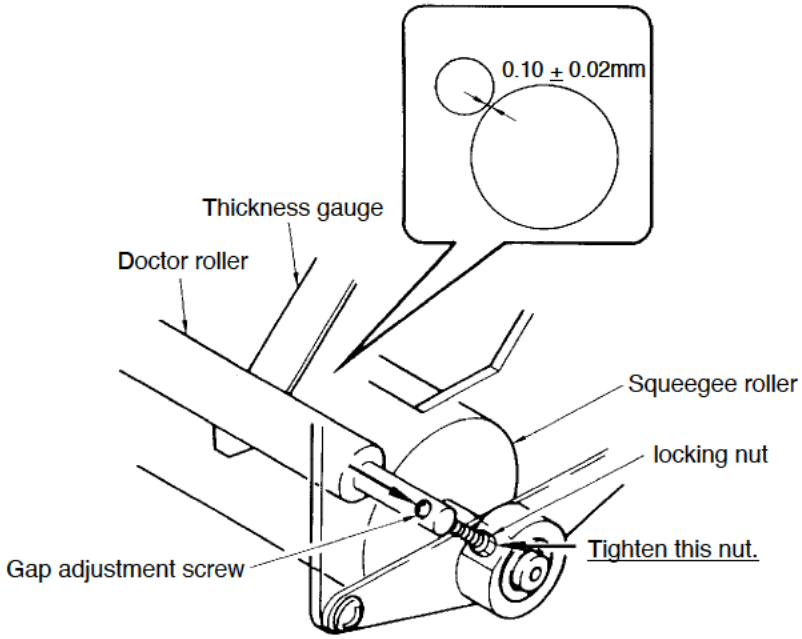
1. Remove the Squeegee unit from the Drum, referring to the page IV-10.
2. Clean ink inside the Squeegee unit.
3. Check if the gap between the Doctor roller and the Squeegee roller is **0.10 ±0.02mm** at any point from end to end, by inserting a thickness gauge between the rollers.
4. If not, adjust the gap following the procedures described below.
   1) Remove the Squeegee belt, referring to the page IV-11.
   2) Remove an E ring at one end of the Squeegee roller shaft, and remove the Squeegee roller pulley. (Refer to the page IV-12.)
   3) Loosen the mounting screws on the Ink blocking plates (front and back) and turn them down to make space for adjustment.
   4) Loosen the locking nuts on the gap adjustment screws on both ends of the Squeegee roller.
   5) Insert a thickness gauge between the Doctor roller and Squeegee roller, and turn the gap adjustment screws to obtain the correct gap **(0.10 ± 0.02mm)** at any check point.
   6) Tighten the locking nuts, holding the gap adjustment screws in this condition with a screw driver, and then check the gap again.

- Precautions In Adjustment -

- Make sure that the gap is equal at both ends of the Squeegee roller.
- When the locking nuts are fastened, the gap will be slightly widened.
- Always adjust the position of the Ink blocking plates after adjusting the Squeegee gap, referring to the page IV-23.
- Be sure to check copy quality after gap adjustment.

- Results of Misadjustment -

- If the gap is too wide;
  too much ink will be transferred to the inner surface of the Drum body, causing ink leakage at the tail edge of the perforated part of the Drum body.
- If the gap is too narrow;
  ink will not spread over the surface of the Squeegee roller well, causing uneven printing.



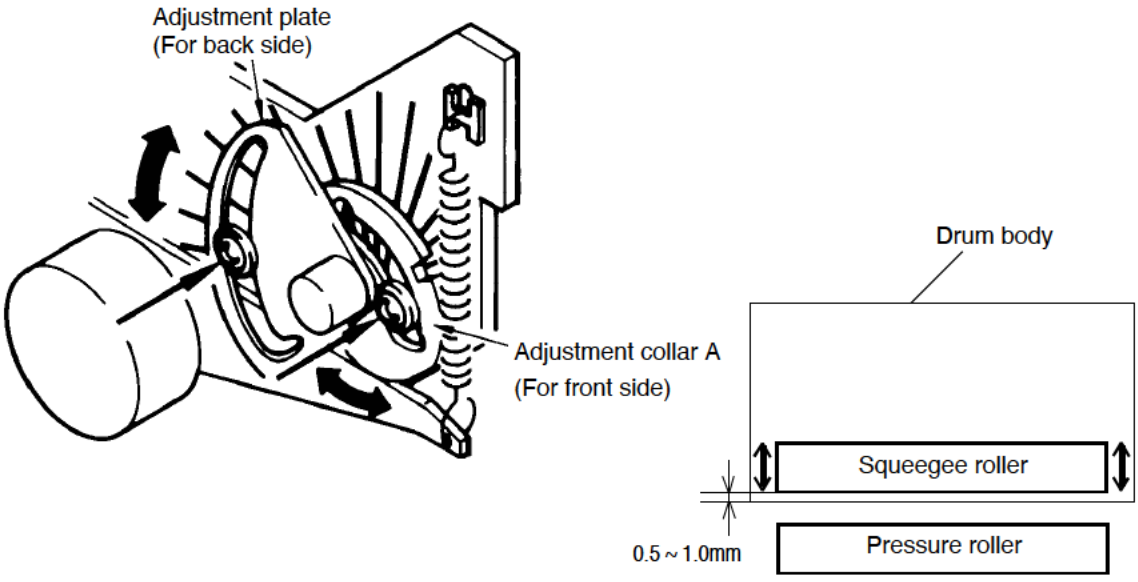
ADJ-18 < *Drum* >

2. Squeegee Pressure Balance

1. Make a master with Test chart **No.8** as an original.
2. Set the print density at **1** (lowest) and prints.
   [Note]
   If the print density adjustment is not available, print at the highest speed.
3. Check if the print density is even on both (right and left) sides of printed copies.
4. If not, adjust the Squeegee pressure balance following the procedures described below.
   1) Remove the Drum cover (lower), referring to the page IV-9.
   2) Remove the Drum cover F (lower), referring to the page IV-14, by which the **Adjustment plate** and **Adjustment collar A** become accessible.
   3) If the density is darker on the drive mechanism side of printed copies, loosen the securing screw on the **Adjustment plate** and turn the plate counter-clockwise.
      If the density is darker on the operation panel side, loosen the securing screw on the **Adjustment collar A** and turn the collar counter-clockwise.
   4) If the density is too light on the whole, turn both the **Adjustment plate** and **Adjustment collar A** clockwise to adjust the entire density.
   5) After adjustment, check that the gap between the Squeegee roller and the Drum body is **0.5 to 1.0mm**, by pressing the Drum body just under the Squeegee roller from outside with a finger. If not, re-adjust the Squeegee pressure balance by following the procedure in the step 4.
   6) Perform the confidential operation to place a blank master on the Drum and feed **500 sheets of paper at the lowest speed**. Then check that no ink leaks at any point on the Drum body. If ink leaks, re-adjust the Squeegee pressure balance by repeating the procedures in the steps 3 to 5 above.

- Results of MIsadjustment -

- If the Squeegee pressure differs much between the front and back sides of the Drum; the print density will be uneven on both sides of printed copies.
- If the Squeegee pressure is too high; too much ink will be transferred to the inner surface of the Drum body, causing ink leakage at the tail edge of the perforated part of the Drum body.
- If the Squeegee pressure is too low; the print density will be weak or too much stress will be applied to the Drum body to shorten its life.



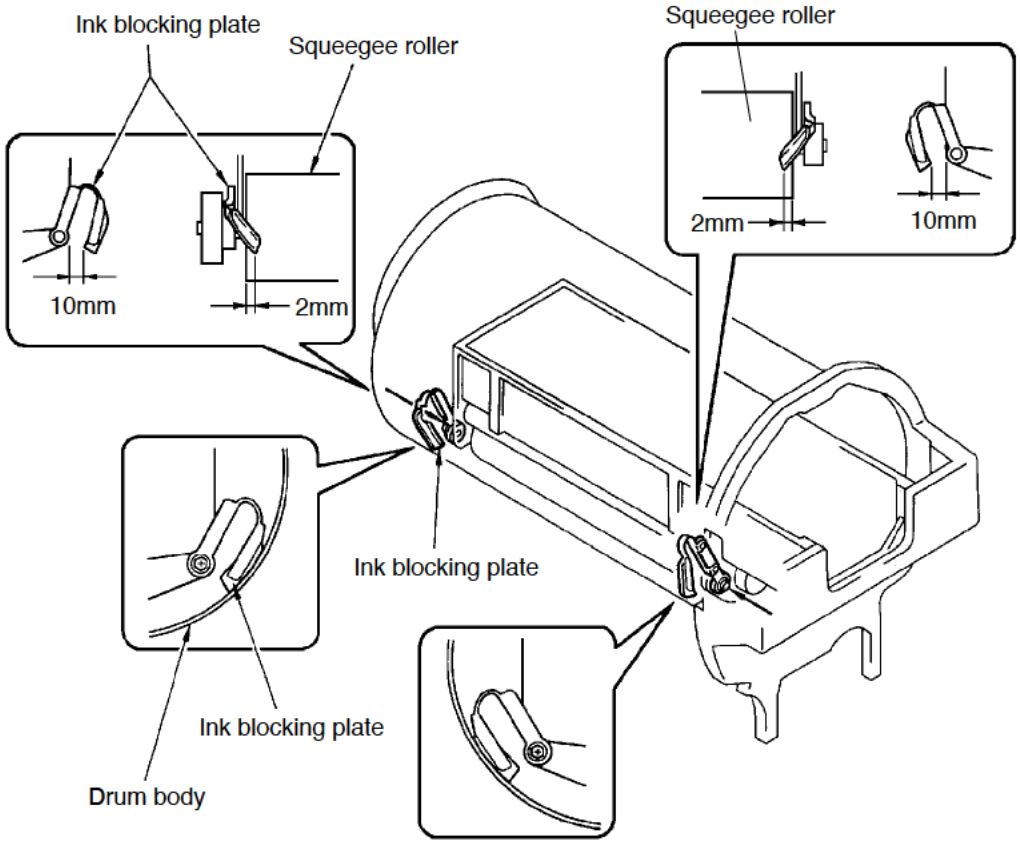
3. Position of Ink Blocking Plates

1. Remove the Squeegee unit from the Drum, referring to the page IV-10.
2. Remove the Drum cover F (lower), referring to the page IV-14.
3. Check if the tip of the Ink blocking plate is **10mm or more** away from the mounting screw on it and is **about 2mm** inside the end of the Squeegee roller at each end of the Squeegee roller, as shown in the figures below.
4. If not, reform the Ink blocking plate by hand to place the plate in the above-mentioned position.
5. Check if the Ink blocking plate is in close contact with the inner surface of the Drum body after installing the Squeegee unit into the Drum.
6. If not, loosen the mounting screw on the Ink blocking plate and adjust the position to put the plate into contact with the Drum body.

[Note]
The Ink blocking plates prevent ink from spreading sideways and keep ink within the print area.

- Results of MIsadjustment -

- If the Ink blocking plates are set too inside;
  ink will be scraped off on sides within the print area, causing missing images on sides on printed copies.
- If the Ink blocking plates are set far from the Squeegee roller or it is not in close contact with the inner surface of the Drum body;
  excess ink will not be scraped off outside the print area, causing ink to leak from the sides of the Drum body.



4. Drum Position A (Drum Home Position)

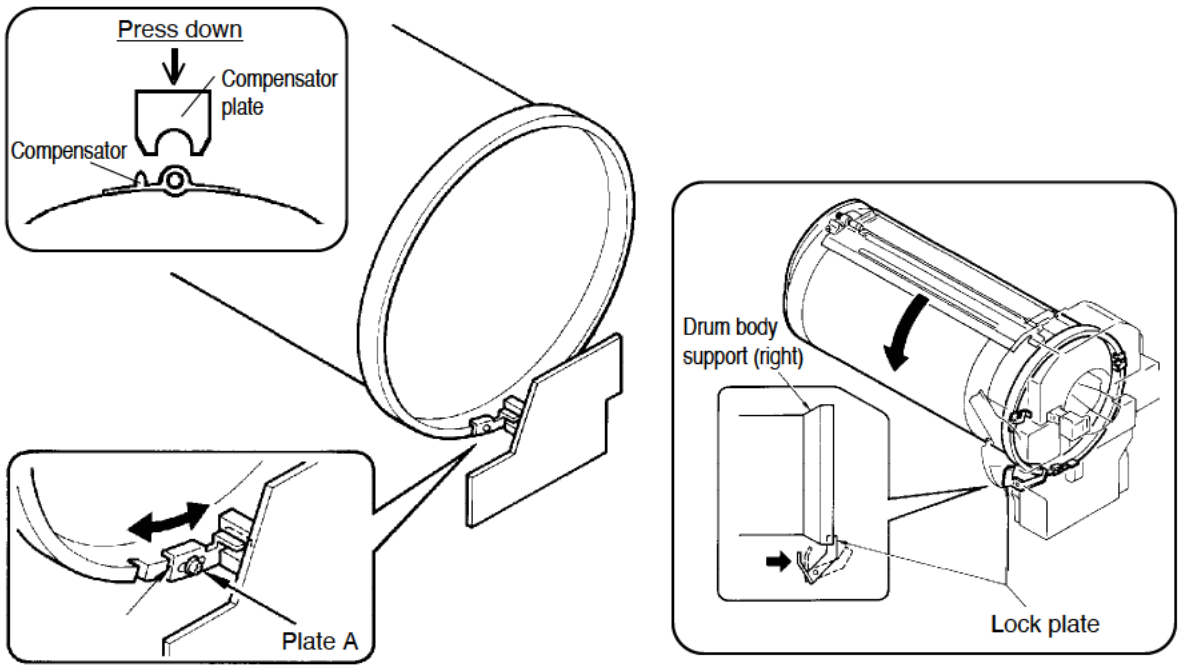
1. Turn ON the power and open the Front cover.
2. Press the Drum home position button to bring the Drum to the Position A.
3. Open the Top cover (or Scanner table) and press down the Compensator plate manually to confirm that the Compensator plate engages right with the Compensator on the Drum to secure gear engagement.
4. If the Compensator plate does not engage with the Compensator or if the Drum moves when they engage, pull out the Drum from the machine and remove the Drum cover (upper), referring to the page IV-9.
   [Note]
   It will be easier to make adjustment if the Drum is kept on the Drum holder.
5. Release the Drum from the rotation lock by manually pressing the Lock plate behind the Drum body support (right) and rotate the Drum manually until you can reach the Plate A.
   [IMPORTANT]
   Rotate the Drum only in the direction indicated by the arrow in the figure below because the reverse rotation will deform the Ink blocking plates.
6. Loosen the mounting screw on the Plate A and adjust the position of the plate to ensure a right gear engagement.
7. Rotate back the Drum to the home position and install it in the machine. Then press the Drum home position button to set the Drum at the Position A for checking gear engagement.
8. Check gear engagement by repeating the procedure in the step 3 above.
   When a right gear engagement is obtained, pull out the Drum and put back on the Drum cover (upper).

- Precautions In Adjustment -

- Close the Top cover (or Scanner table) when pressing the Drum home position button because the Drum is prevented from rotating by a safety interlock sw when it is open.

- Results of Misadjustment -

- If a right gear engagement is not secured when the Drum is at the Position A;
  the Clamp motor will not smoothly open or close the Clamp plate in master removal and loading operations and, as a result, the error code **[E 03]** will be displayed on the operation panel.



5. Squeegee Gap <GR>

1. Remove the Squeegee unit from the Drum, referring to the page IV-10.
2. Clean ink inside the Squeegee unit.
3. Check if the gap between the Doctor roller and the Squeegee roller is as indicated below at any point from end to end, by inserting a thickness gauge between the rollers.

A3 or Ledger Drum : **0.07 ± 0.02 mm**	B4, A4 or Legal Drum : **0.10 ± 0.02 mm**

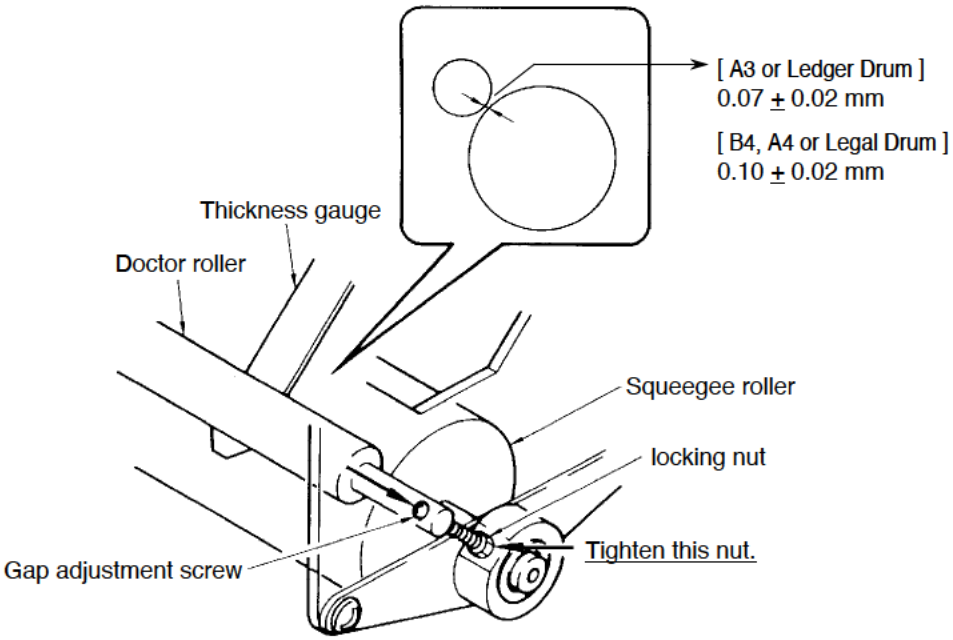
4. If not, adjust the gap following the procedures described below.
   1) Remove the Squeegee belt, referring to the page IV-11.
   2) Remove an E ring at one end of the Squeegee roller shaft, and remove the Squeegee roller pulley. (Refer to the page IV-12.)
   3) Loosen the mounting screws on the Ink blocking plates (front and back) and turn them down to make space for adjustment.
   4) Loosen the locking nuts on the gap adjustment screws on both ends of the Squeegee roller.
   5) Insert a thickness gauge between the Doctor roller and Squeegee roller, and turn the gap adjustment screws to obtain the correct gap at any check point.
   6) Tighten the locking nuts, holding the gap adjustment screws in this condition with a screw driver, and then check the gap again.

- Precautions In Adjustment -

- Make sure that the gap is equal at both ends of the Squeegee roller.
- When the locking nuts are fastened, the gap will be slightly widened.
- Always adjust the position of the Ink blocking plates after adjusting the Squeegee gap, referring to the page IV-23.
- Be sure to check copy quality after gap adjustment.

- Results of Misadjustment -

- If the gap is too wide;
  too much ink will be transferred to the inner surface of the Drum body, causing ink leakage at the tail edge of the perforated part of the Drum body.
- If the gap is too narrow;
  ink will not spread over the surface of the Squeegee roller well, causing uneven printing.



5.ADF Image Scanning Section

[Theory of Operation]

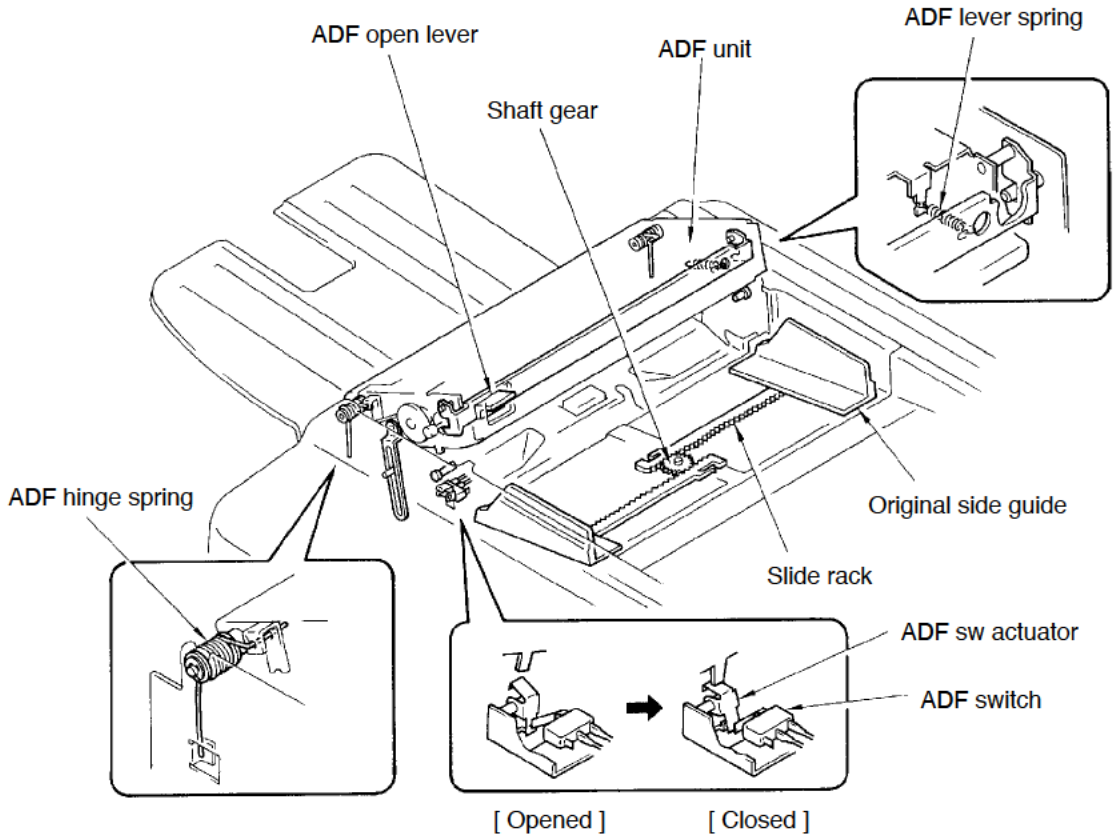
1. ADF Setting System

- Basic
The Auto Document Feed (ADF) unit feeds originals through the Image scanner.

- Opening the ADF Unit
By pushing up the Open lever, the hook is released.
Once the hook is released, the ADF hinge spring lifts the ADF unit open.

- ADF Switch Function
When the ADF unit is closed, the ADF switch is pressed to confirm that it is closed.
If this switch is not pressed ON, the error code **[E 59]** is displayed.

- Original Side Guides Movement
When either of two Side guides is moved against originals, its movement is transmitted to the other Side guide via Slide racks and Shaft gear, positioning the originals to the center of the ADF unit.



2. Original Loading System

- Basic

An original is loaded into the ADF unit via the Original feed motor and waits until the “START” button is pressed to start the original scanning operation.

- Start of Original Loading

When originals are set in the ADF unit, they push the actuator out of the Original detection sensor.
2 seconds later, the Original feed solenoid is energized and lifts the ADF pickup pad, raising originals against the ADF pickup roller (via Solenoid arm).
200 ms later, the Orignal feed motor is energized to turn the ADF pickup roller and ADF stripper roller (via ADF gear and belt).

- Pickup of One Original

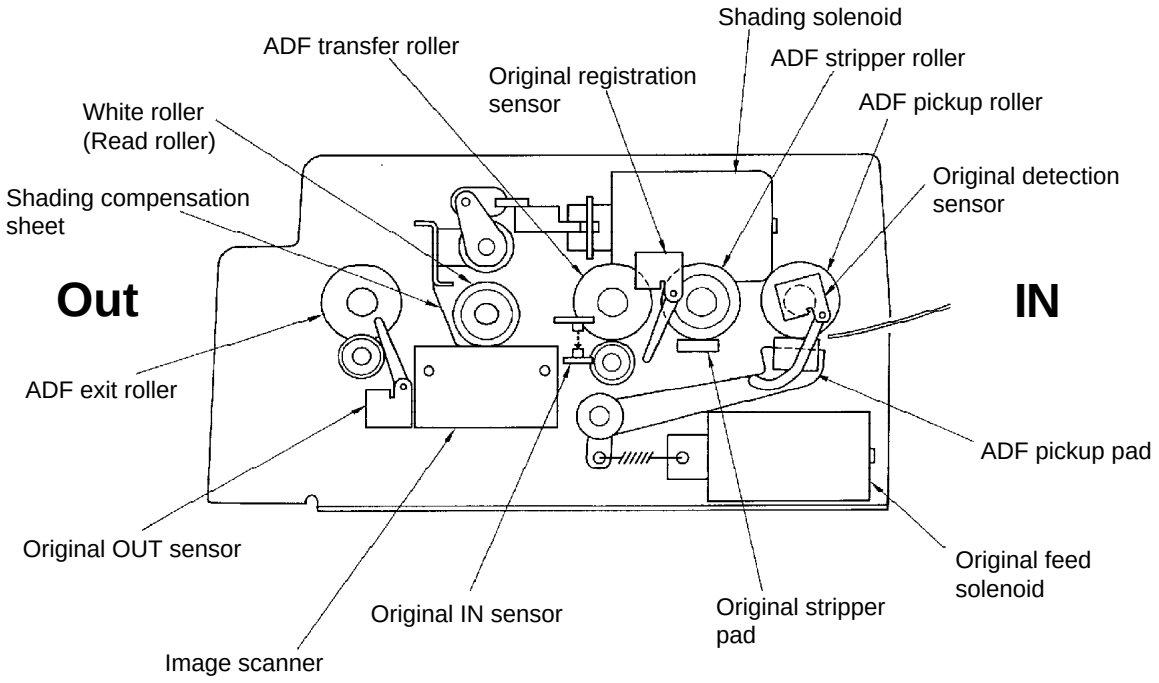
As the Original stripper pad is pressed against the ADF stripper roller by the Stripper arm spring, one original is separated and fed into the ADF unit by rotation of the ADF stripper roller.
The original pushes the actuator out of the Original registration sensor, and **200 ms** later, the Original feed solenoid and Original feed motor are turned OFF.
10 ms later, the Read pulse motor is activated to turn the ADF transfer roller, White roller (Read roller) and ADF exit roller via pulleys and belts.

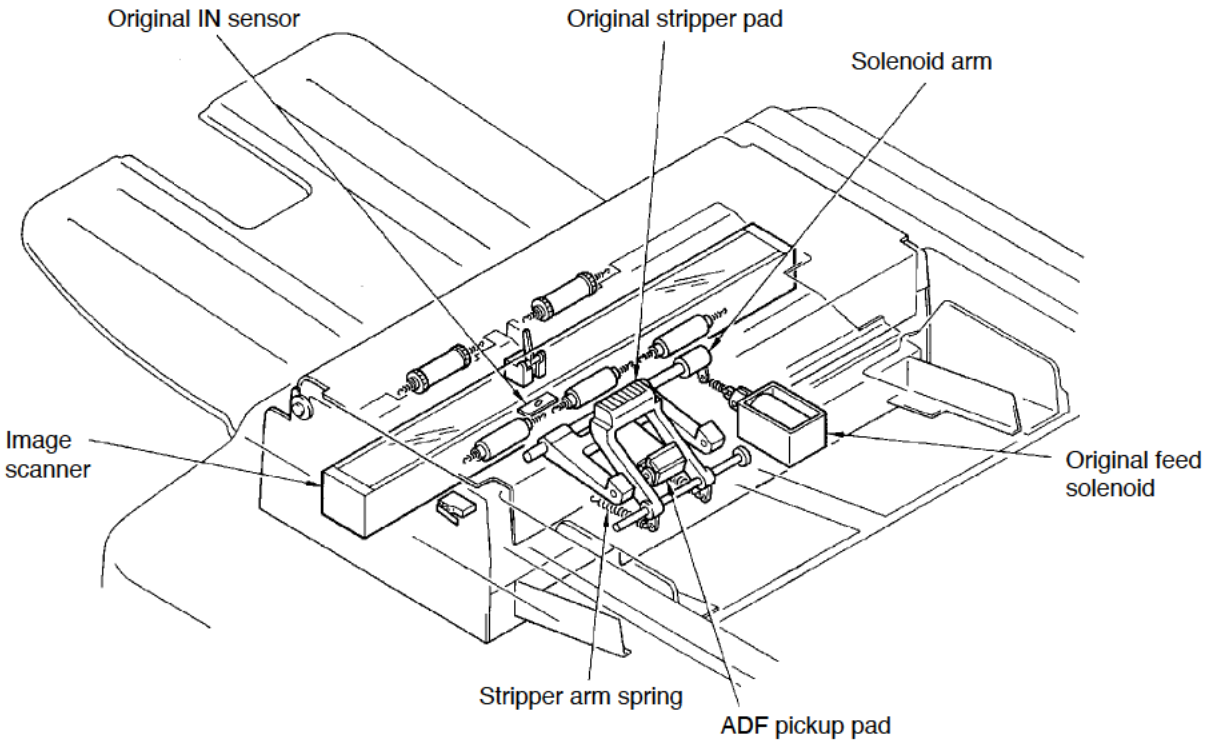
- Finish of Original Loading

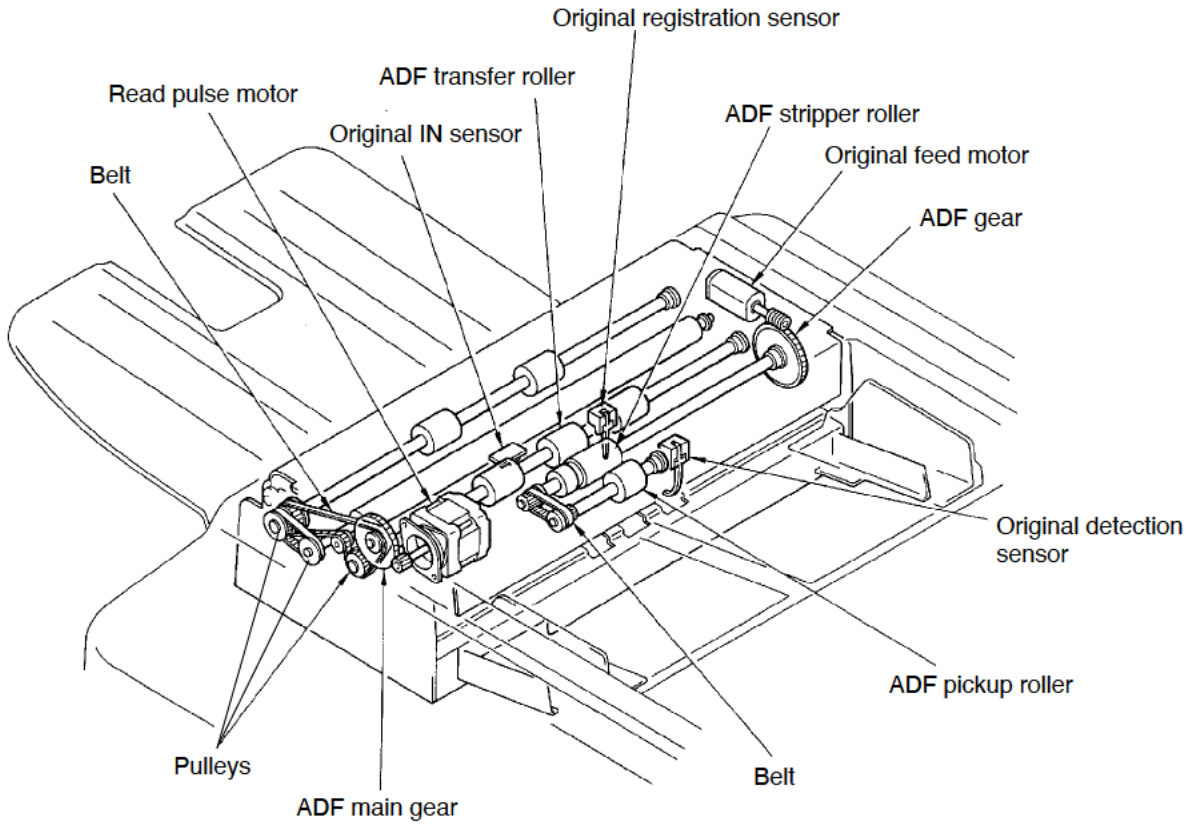
The Read pulse motor is turned OFF **315 pulses** after the lead edge of the original blocks the light path of the Original IN sensor.

- Change of Panel Display

The Print/Master-making display on the operation panel is changed from "PRINT" to "MASTER MAKING".

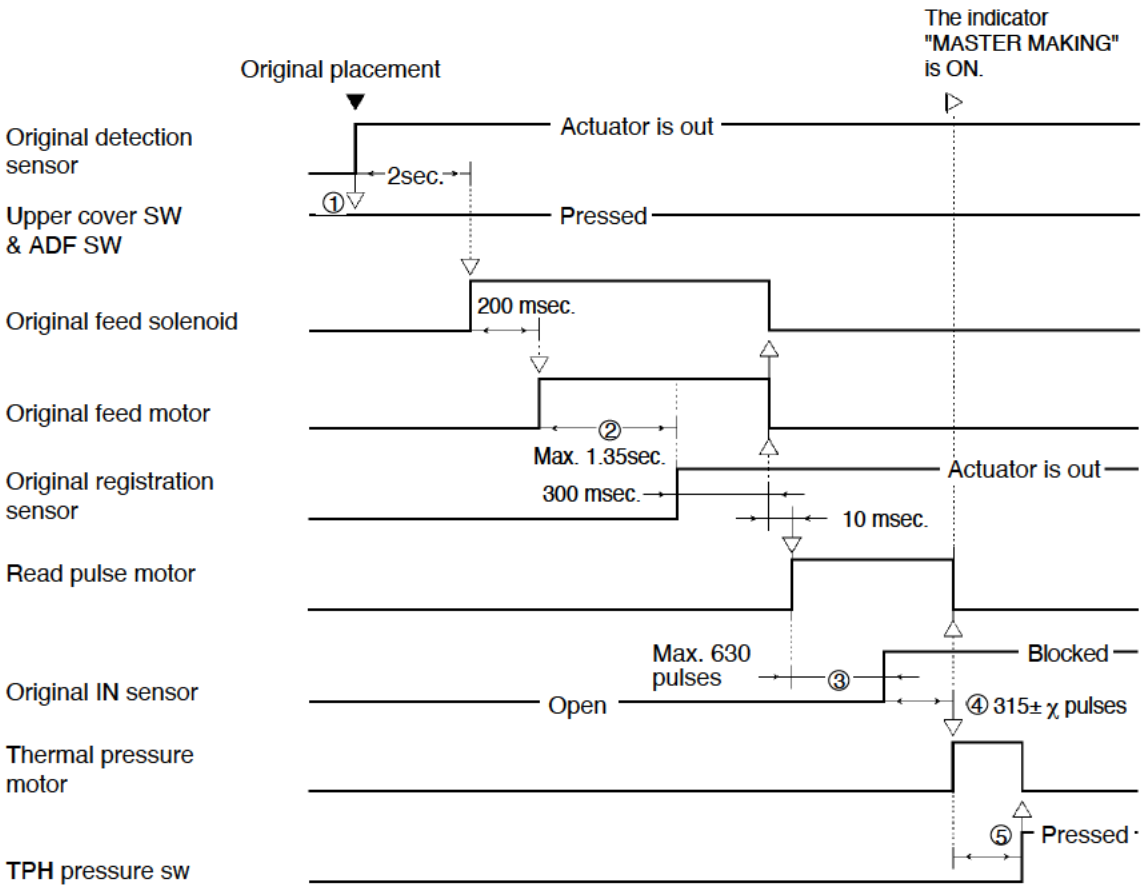



Original IN sensor
Original stripper pad
Solenoid arm
Image scanner
Original feed solenoid
Stripper arm spring
ADF pickup pad


Original registration sensor
ADF transfer roller
Read pulse motor
Original IN sensor
ADF stripper roller
Original feed motor
Belt
ADF gear
Original detection sensor
ADF pickup roller
Pulleys
ADF main gear
Belt

- Timing Chart -

Original Loading System



① The Upper cover sw and ADF sw have to be ON to activate the Original detection sensor.

② If the Original registration sensor does not detect an original **within 1.35 seconds** after the Original feed motor is activated ON, the machine assumes the original has misfed and indicates the error code **[E 36]**.

③ If the Original IN sensor does not detect an original **within 630 pulses** after the Read pulse motor is activated ON, the machine assumes the original has jammed at the entrance and indicates the error code **[E 37]**.

④ The adjustment of "χ" pulses is possible by using the Test mode **No.86**.

⑤ If the TPH pressure sw is not actuated ON **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has been locked and indicates the error code **[E 19]**.

* The LED indicator "WAIT" blinks on the operation panel during loading originals, preventing any key operation.

3. Image Scanning System

- Shading Compensation

When the "START" button is pressed, after the Original has been set in position, the Shading compensation sheet is pushed out over the Image scanner by the Shading solenoid (via Shading link joint).

200 ms later, the LED arrays of the Image scanner are turned ON and the "Shading Compensation" is performed.

200 ms later, the Shading solenoid is deenergized.

- Start of Scanning

As soon as the Solenoid is deenergized, the Read pulse motor is activated to feed the original by rotating the ADF transfer roller, White roller (Read roller) and ADF exit roller via pulleys and belts.

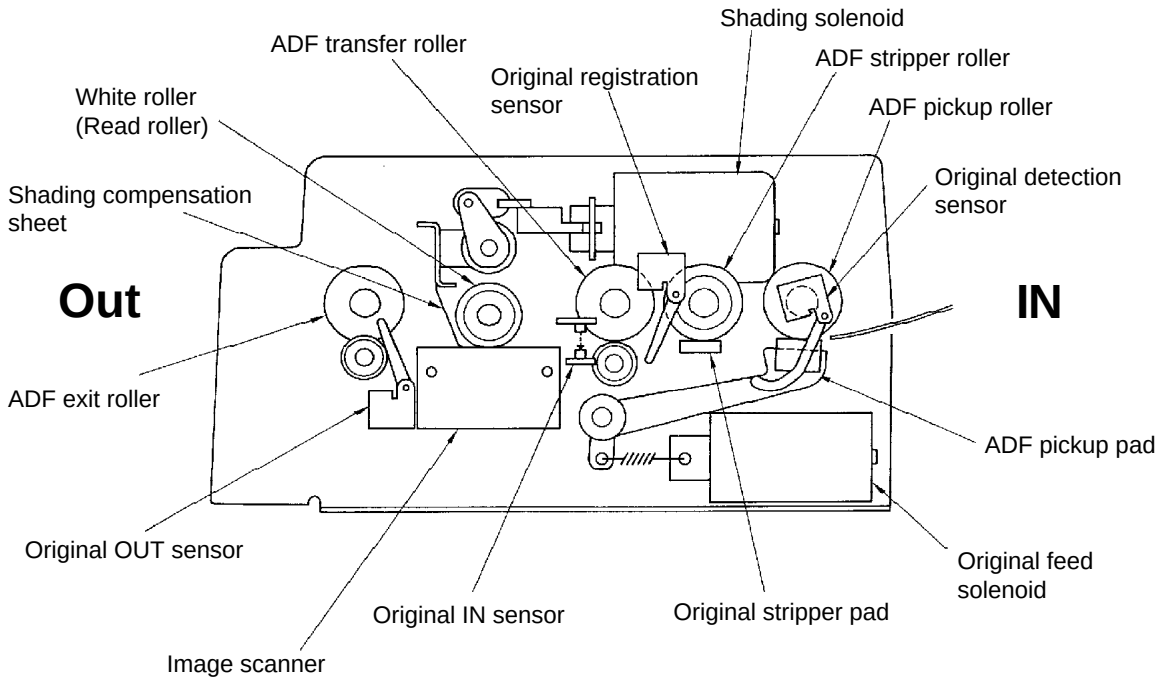
520 pulses later, the Read and Write start signal is output to start the scanning of the original.

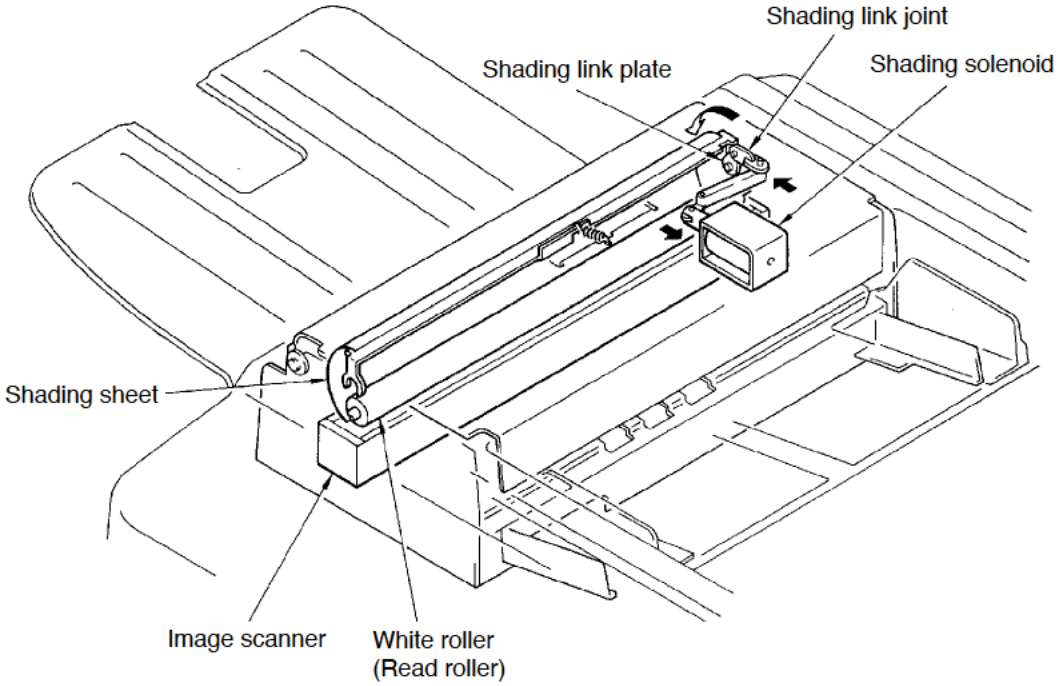
- Finish of Scanning

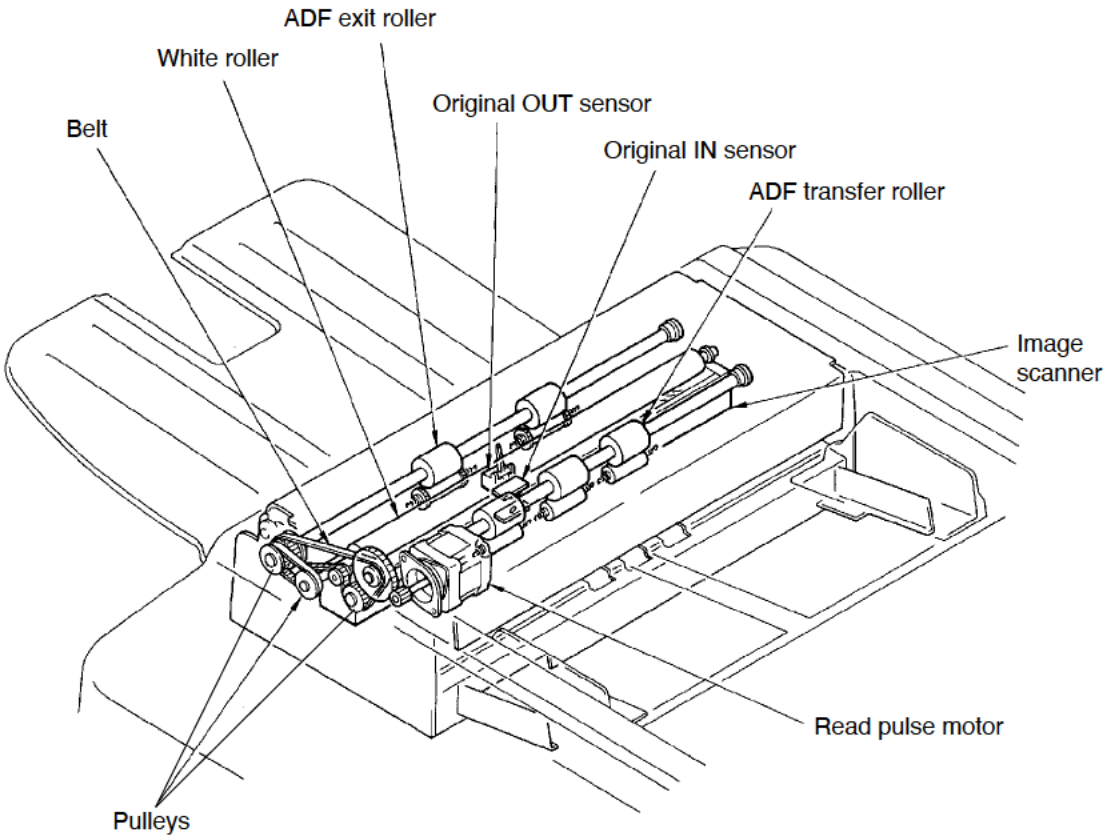
652 pulses after the trailing edge of the original has passed through the light path of the Original IN sensor, the scanning of the original is finished by turning off the LED arrays and the Read and Write start signal.

- Ejection of Original

The Read pulse motor is rotated for **1575 pulses** after the Read and Write start signal is turned off, to finish transportation of the original onto the Original tray.

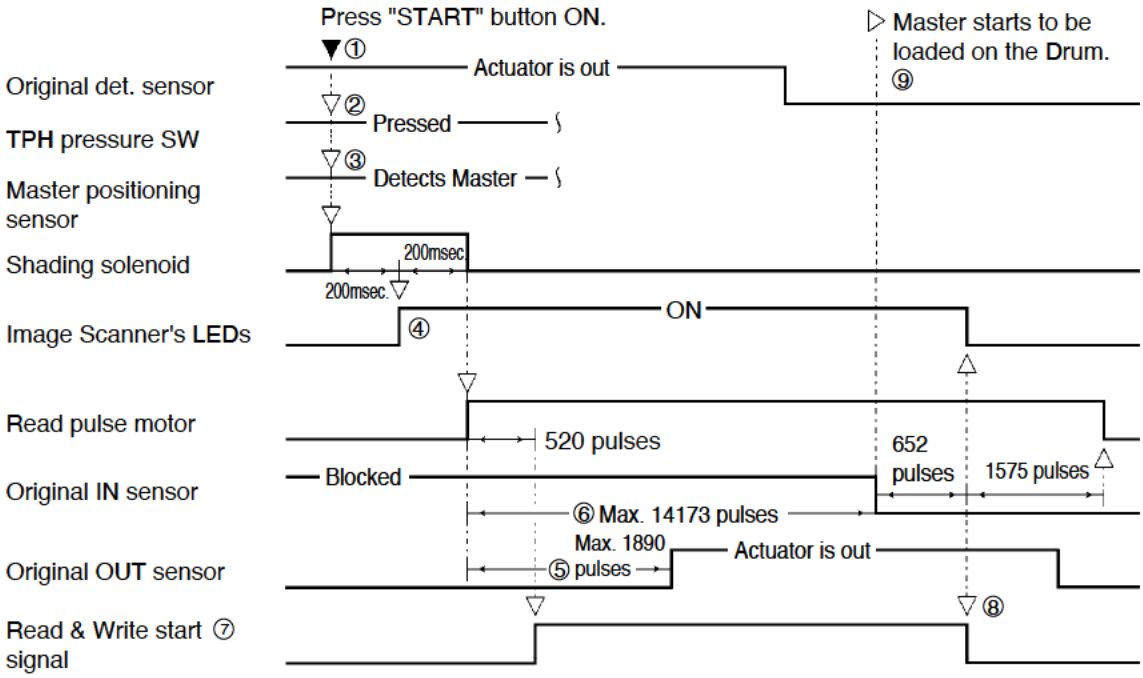



Shading link joint
Shading link plate
Shading solenoid
Shading sheet
Image scanner
White roller
(Read roller)


ADF exit roller
White roller
Original OUT sensor
Belt
Original IN sensor
ADF transfer roller
Image
scanner
Read pulse motor
Pulleys

- Timing Chart -

Image Scanning System



① The START button input is not accepted if an original is not present.

② The Read and Write operation only starts when the TPH pressure switch is pressed ON.
If the TPH pressure switch is not ON, the Thermal pressure motor operates until the TPH pressure switch is pressed ON.

③ The Read and Write operation only starts when the Master positioning sensor detects master.
If the Master positioning sensor doesn't detect master material, master material is fed until the sensor detects it.

④ The "Shading Compensation" starts when the LED arrays of the Image scanner are turned ON.

⑤ If the Original OUT sensor does not detect an original **within 1890 pulses** after the Read pulse motor is activated ON, the machine assumes the original has jammed at the exit and indicates the error code **[E 39]**.

⑥ If the Original IN sensor has been detecting an original **for 14173 pulses** after the Read pulse motor was activated ON, the machine assumes the original has jammed or is oversized and indicates the error code **[E 38].**

⑦ The Read and Write start signal starts the Read and Write operation.

⑧ The Read and Write start signal is turned OFF, either when the Read pulse motor has turned **for 652 pulses** after an original passed through the Original IN sensor, or when the Write pulse motor has turned for [A] pulses. ([A] pulses are as follows for the respective models: **5622 pulses** for B4 model, **5480 pulses** for Legal one and **4566 pulses** for A4 one)

⑨ The master starts to be loaded on the Drum, when an original has passed through the Original IN sensor, or when the Read and Write start signal is turned OFF.
If the Write pulse motor has not turned **for 4566 pulses**, the master starts to be loaded on the Drum only after the motor has turned for 4566 pulses even if both of the above-mentioned conditions are satisfied.

5. ADF Image Scanning Section

[Removal and Assembly]

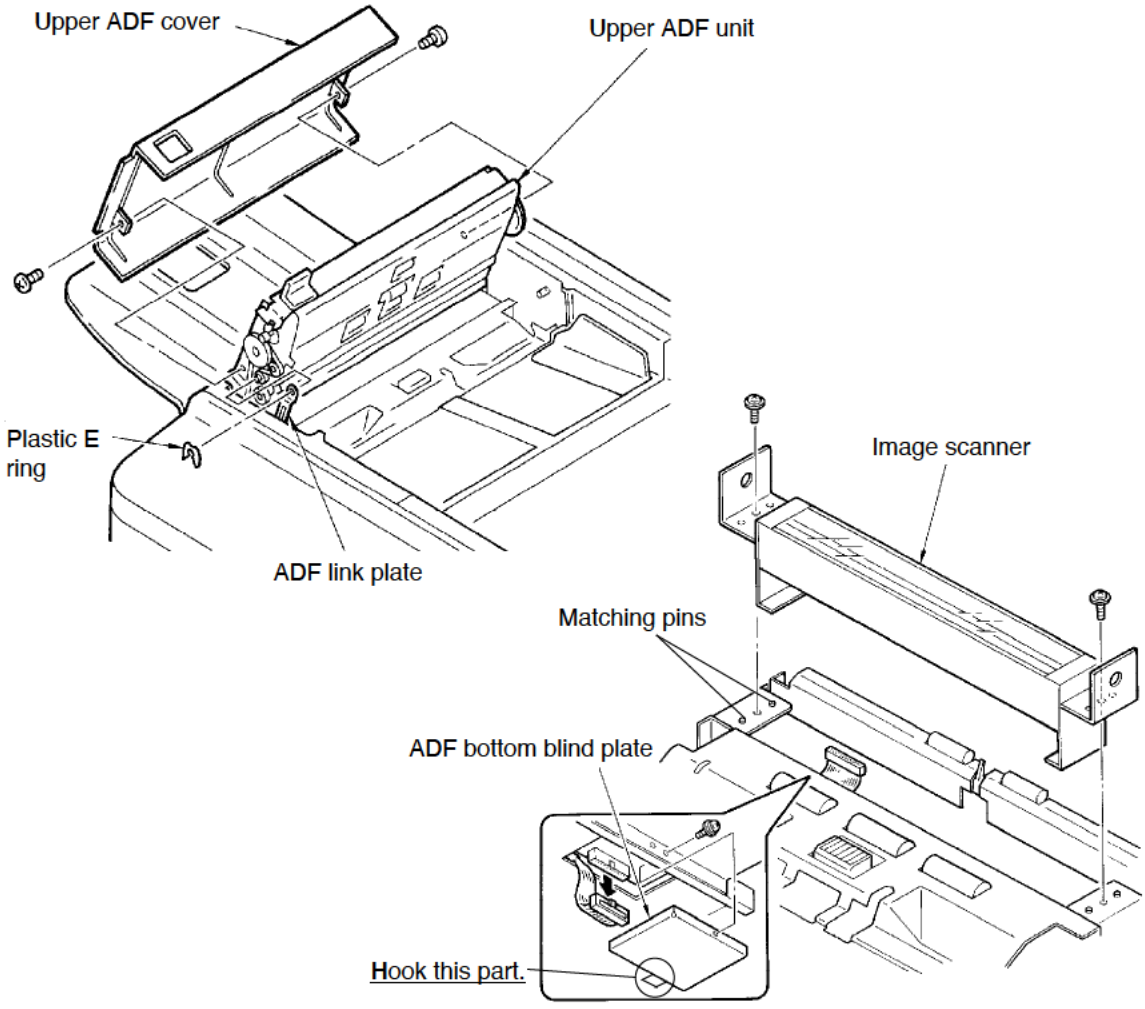
1. Image Scanner

< Removal Procedure >

1. Turn OFF the power and pull out the Master disposal box from the machine.
2. Remove the mounting screw on the ADF bottom blind plate, and remove the plate.
3. Disconnect the connector from the Image scanner.
4. Open the Upper ADF unit.
   Remove two mounting screws on the Upper ADF cover and remove the cover.
   [IMPORTANT]
   Always remove the cover. Otherwise, damage the wire harness in the unit.
5. Remove a plastic E ring securing the ADF link plate to the unit and turn aside the unit.
6. Remove two mounting screws on the Image scanner and remove the scanner.

- Precautions In Assembly -

- Place the Image scanner correctly in position by matching the holes on the scanner bracket with the pins on the ADF unit.
- Make sure to hook the projection of the ADF bottom blind plate to the frame.
- Make sure to secure the ADF link plate with a plastic E ring.



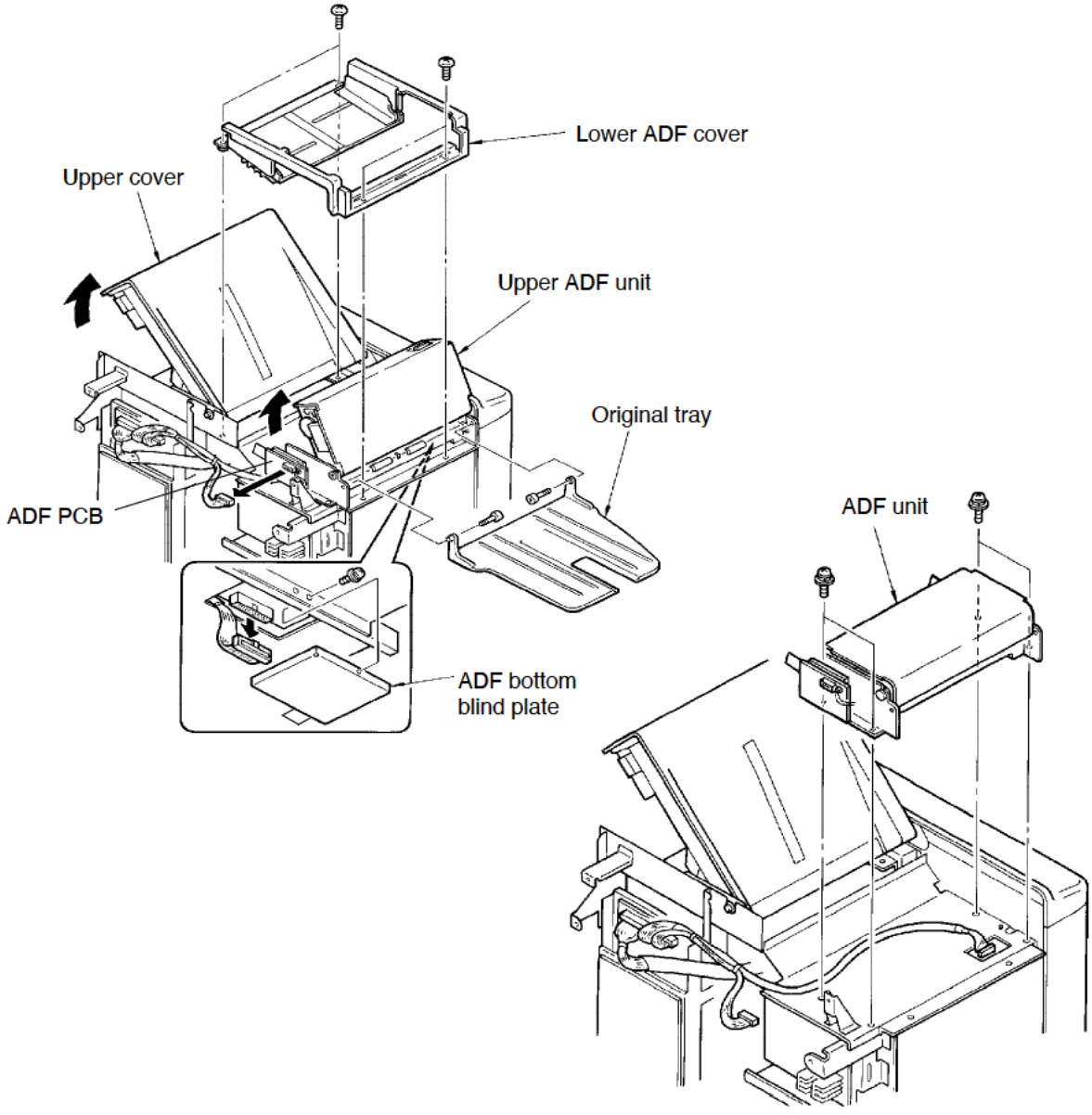
2. ADF Unit

< Removal Procedure >

1. Turn OFF the power and remove the Back cover.
2. Remove two mounting screws on the Original tray, and remove the tray.
3. Open the Upper cover and Upper ADF unit.
   Remove four mounting screws on the Lower ADF cover and remove the cover.
4. Disconnect the connector from **CN6** on the **ADF PCB**.
5. Pull out the Master disposal box from the machine.
   Remove the ADF bottom blind plate and disconnect the connector from the Image scanner.
6. Remove four mounting screws on the ADF unit and take out the unit from the machine.

- Precautions In Assembly -

- Make sure to hook the projection of the ADF bottom blind plate to the frame.



3. Original IN Sensor (Receive)

< Removal Procedure >

1. Remove the ADF unit from the machine, referring to the previous page, and turn it upside down.
2. Uuhook the Original IN sensor (receive) from the opening of the ADF unit frame by pinching the hooks of the cover with a plier.
3. Disconnect the connector from **CN4** on the **ADF PCB**.
4. Cut the wire clampers holding the wires of the Original IN sensor (receive) and remove the sensor.

- Precautions In Assembly -

- Make sure to secure the wires of the sensor with wire clampers as before removal.

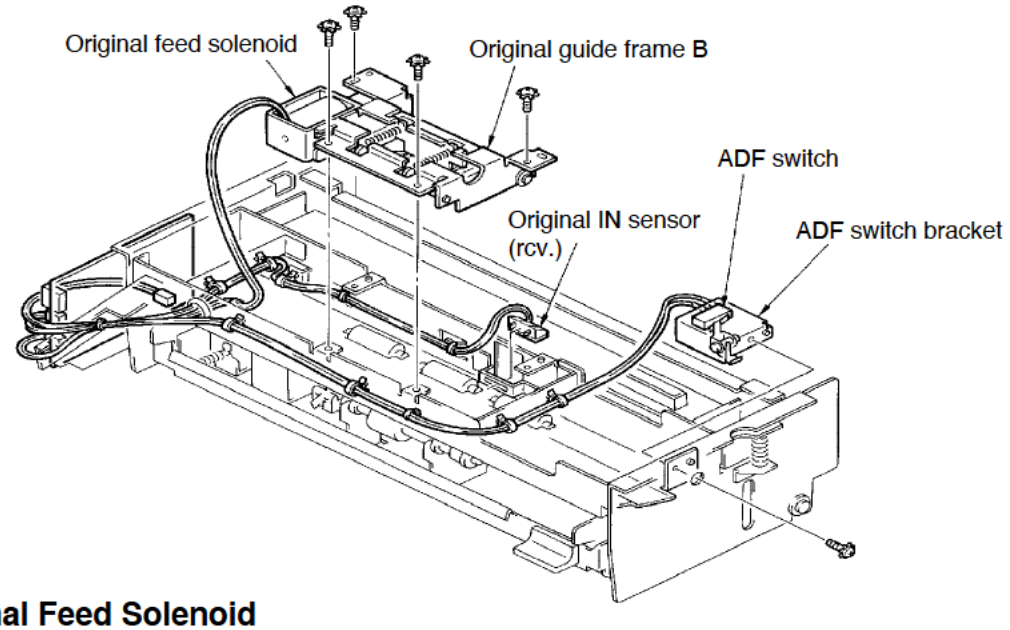
4. ADF Switch

< Removal Procedure >

1. Remove the ADF unit from the machine, referring to the previous page, and turn it upside down.
2. Remove the mounting screw of the ADF switch bracket, and remove the switch with the bracket attached.
3. Disconnect the connector from **CN7** on the **ADF PCB**.
4. Cut the wire clampers holding the wires of the ADF sw and remove the sensor from the bracket.

- Precautions In Assembly -

- Make sure to secure the wires of the switch with wire clampers as before removal.



5. Original Feed Solenoid

< Removal Procedure >

1. Remove the ADF unit from the machine, referring to the previous page, and turn it upside down.
2. Remove four mounting screws on the Original guide frame B, and remove it with the Original feed solenoid attached.
3. Disconnect the connector from **CN2** on the **ADF PCB**.
4. Cut the wire clampers holding the wires of the Original feed solenoid and remove the solenoid from the Original guide frame B.

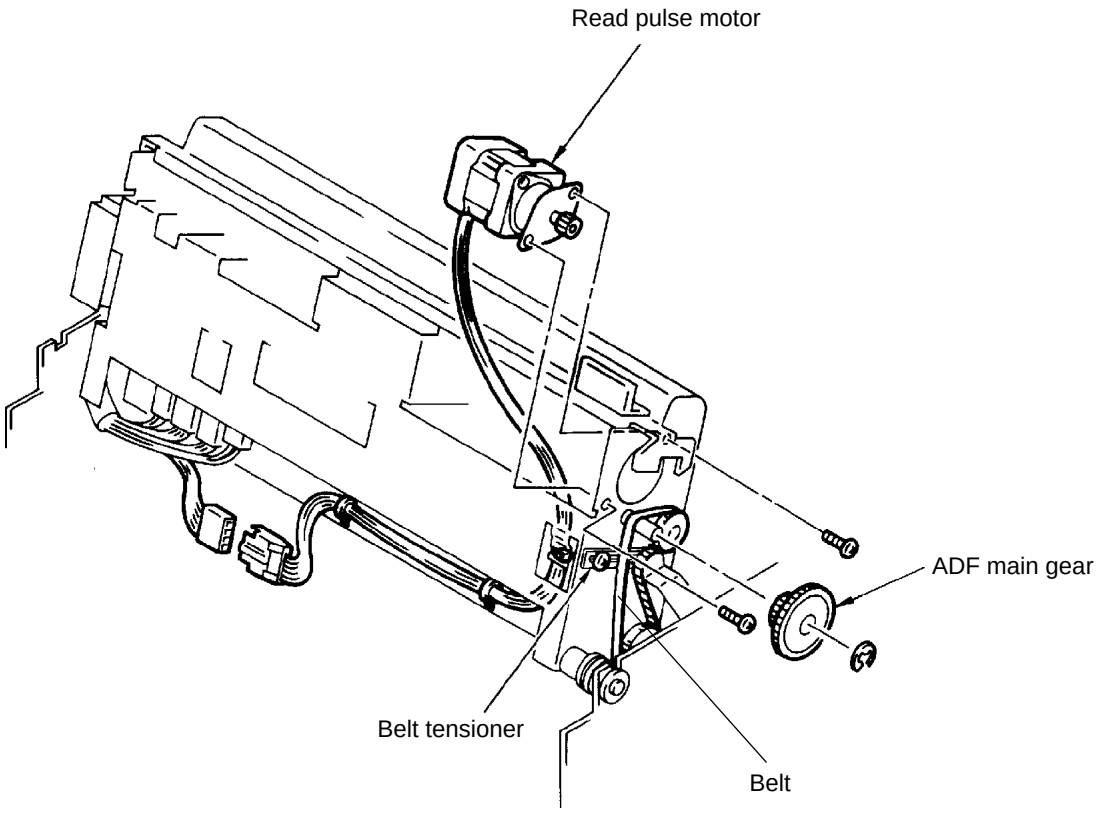
6. Read Pulse Motor

< Removal Procedure >

1. Turn OFF the power and open the Upper ADF unit.
2. Remove the Upper ADF cover, referring to the page V-9.
3. Loosen the securing screw of the belt tensioner to loosen the tension of the belt on the ADF main gear.
3. Remove an E ring at the end of the shaft, and remove the ADF main gear.
4. Disconnect the connector of the Read pulse motor and cut the wire clampers holding the wires of the motor.
5. Remove two mounting screws of the Read pulse motor, and remove the motor.

- Precautions in Assembly -

- Make sure to secure the wires of the motor with wire clampers as before removal.
- Confirm that the gear of the Read pulse motor is well engaged with the ADF main gear.
- Make sure to set the tension of the belt on the ADF main gear correctly (not too loose or too tight) by adjusting the position of the belt tensioner.



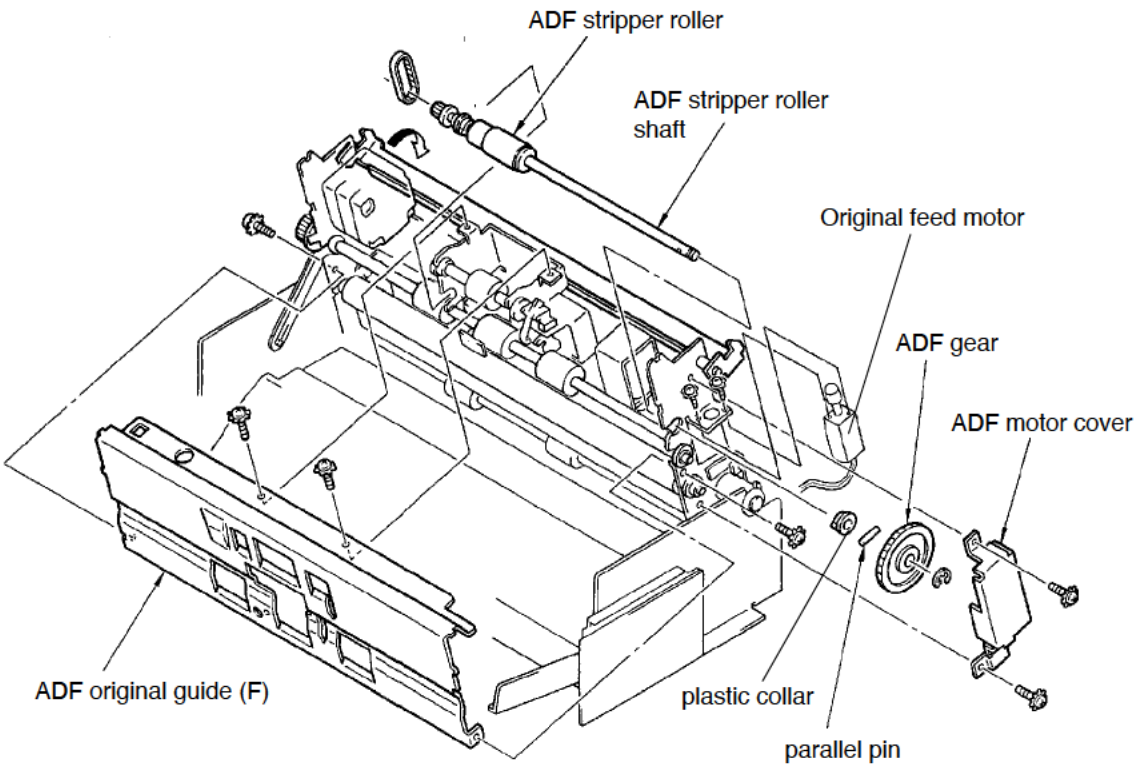
7. Original Feed Motor

< Removal Procedure >

1. Turn OFF the power and open the Upper ADF unit.
2. Remove the Upper ADF cover and turn aside the Upper ADF unit, referring to the page V-9.
3. Remove two mounting screws on the ADF motor cover, and remove the cover.
4. Remove an E ring at the end of the ADF stripper roller shaft, and remove the ADF gear and a parallel pin inserted into the shaft behind it.
   [IMPORTANT]
   Don't drop a parallel pin when removing the ADF gear because it will be freed.
5. Disconnect the connector of the Original feed motor and cut the wire clamper holding the wires.
6. Remove two mounting screws of the Original feed motor, and remove the motor.

- Precautions In Assembly -

- Make sure to secure the wires of the motor with a wire clamper as before removal.



8. ADF Stripper Roller

< Removal Procedure >

1. Remove the ADF gear and a parallel pin, following the steps 1 to 4 of the removal procedures of "Original Feed Motor" above.
2. Remove four mounting screws on the ADF original guide (F), and remove the guide.
3. Slide a plastic collar off the ADF stripper roller shaft and take a belt off the pulley at the other end of the shaft.
4. Remove the shaft from the Upper ADF unit frame.
   Remove an E ring on the shaft and slide the ADF stripper roller off the shaft.

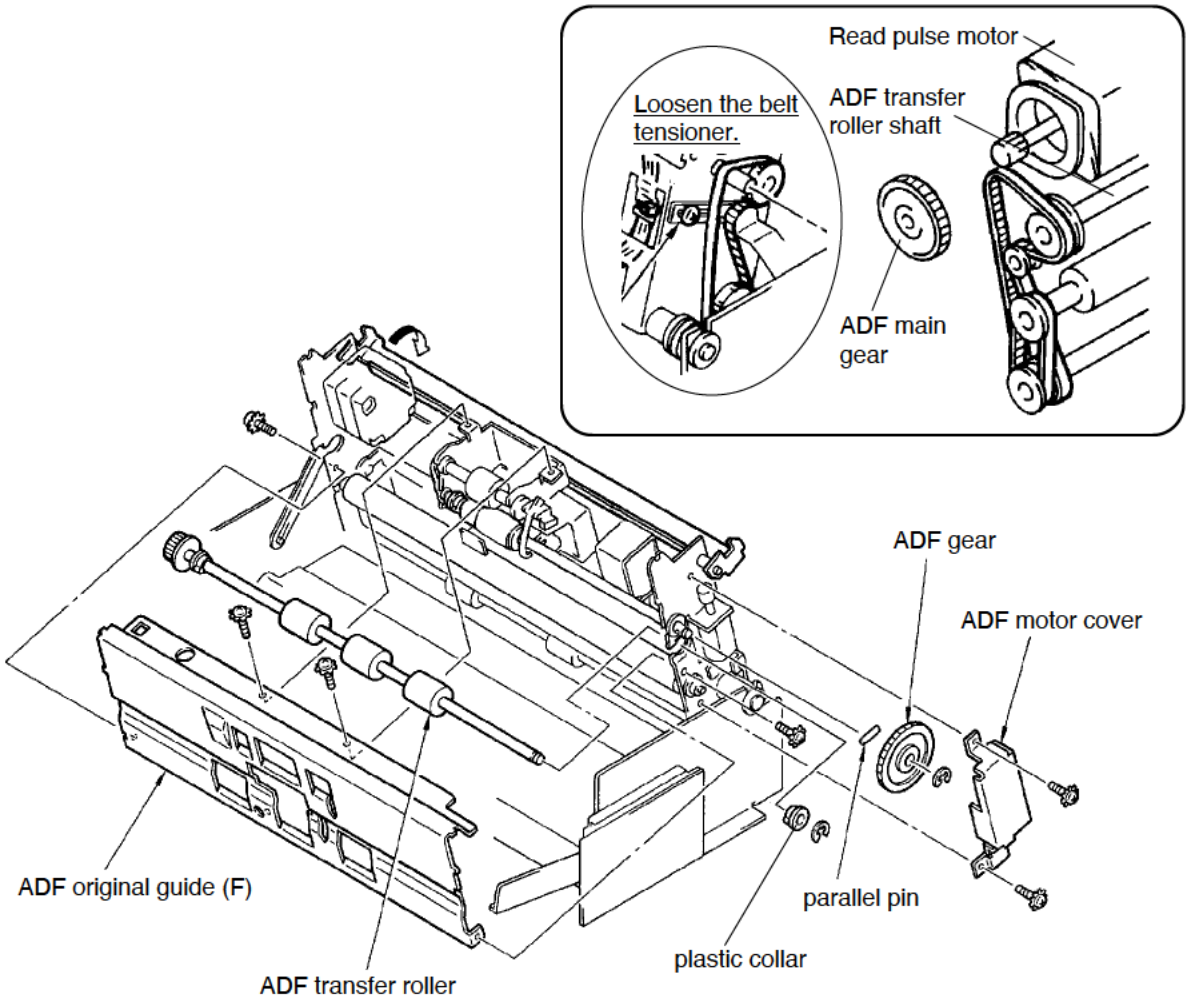
9. ADF Transfer Roller

< Removal Procedure >

1. Remove the ADF gear and a parallel pin behind it, following the steps 1 to 4 of the removal procedure of "Original Feed Motor", which is described in the previous page.
2. Remove four mounting screws on the ADF original guide (F), and remove the guide.
3. Remove an E ring at the end of the ADF transfer roller shaft and slide a plastic collar off the shaft.
4. Loosen the securing screw of the belt tensioner to loosen the tension of the belt on the ADF main gear.
5. Remove an E ring at the end of the shaft, and remove the ADF main gear.
6. Disengage a belt from the pulley at the other end of the ADF transfer roller shaft and take out the ADF transfer roller, sliding a metal bearing off the Upper ADF unit frame.
7. Remove an E ring at the end of the shaft, and remove the pulley, a parellel pin and a metal bearing from the shaft.
   [IMPORTANT]
   Don't drop a parallel pin when removing the pulley because it will be freed.

- Precautions In Assembly -

- Confirm that the ADF main gear is well engaged with the gear of the Read pulse motor.
- Make sure to set the tension of the belt on the ADF main gear correctly (not too loose or too tight) by adjusting the position of the belt tensioner.



10. Original Detection Sensor

< Removal Procedure >

1. Open the Upper ADF unit and remove the Upper ADF cover, referring to the page V-9.
2. Remove the ADF original guide (F), referring to the figure on the previous page.
3. Disconnect the relay connector for the Original detection sensor, unhook the connector of the sensor from the Upper ADF unit frame and cut the wire clamper holding the wires of the sensor.
4. Remove the sensor from the ADF sensor bracket by pinching the hooks of the cover with a plier.

- Precautions In Assembly -

- Make sure to secure the wires of the sensor with wire clampers as before removal.

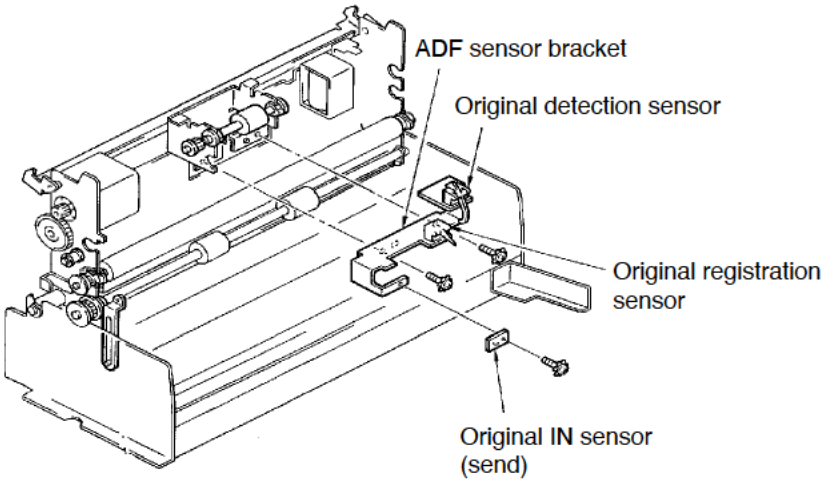
11. Original Registration Sensor

< Removal Procedure >

1. Remove the ADF transfer roller, referring to the previous page.
2. Remove two mounting screws on the ADF sensor bracket, and remove the bracket.
3. Disconnect the relay connector for the Original registration sensor, unhook the connector of the sensor from the Upper ADF unit frame and cut the wire clamper holding the wires of the sensor.
4. Remove the sensor from the ADF sensor bracket by pinching the hooks of the cover with a plier.

- Precautions In Assembly -

- Make sure to secure the wires of the sensor with wire clampers as before removal.
- Make sure to match the holes on the bracket with the positioning bosses on the frame.



12. Original IN Sensor (Send)

< Removal Procedure >

1. Open the Upper ADF unit and remove the Upper ADF cover, referring to the page V-9.
2. Remove the ADF original guide (F), referring to the figure on the previous page.
3. Disconnect the relay connector for the Original IN sensor (send)r, unhook the connector of the sensor from the Upper ADF unit frame and cut the wire clamper holding the wires of the sensor.
4. Remove the mounting screw on the Original IN sensor (send), and remove the sensor.

- Precautions In Assembly -

- Make sure to secure the wires of the sensor with wire clampers as before removal.

13. ADF Pickup Roller
14. White Roller (Read Roller)
15. ADF Exit Roller

13. ADF Pickup Roller

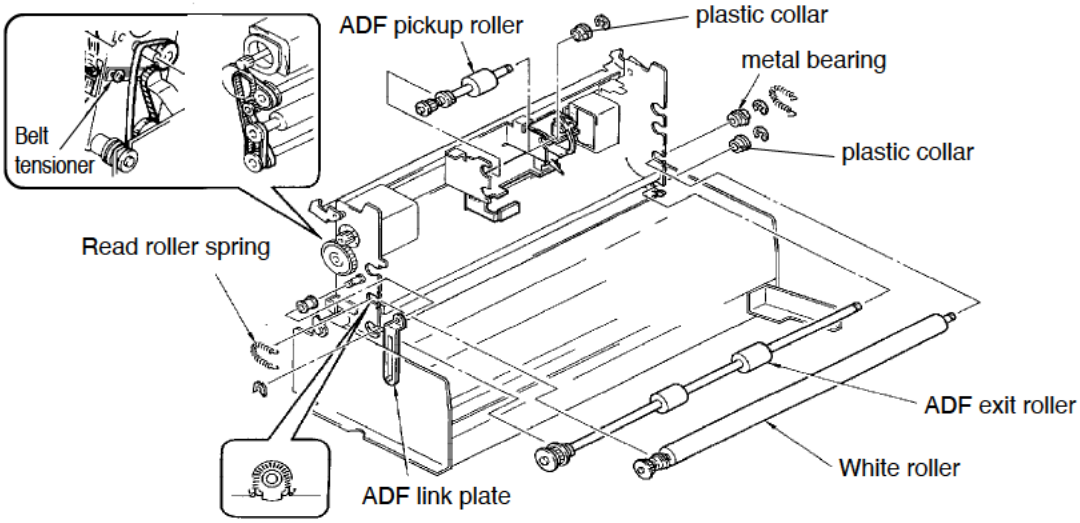
< Removal Procedure >

1. Open the Upper ADF unit and remove the Upper ADF cover, referring to the page V-9.
2. Remove the ADF original guide (F), referring to the figure on the page V-14.
3. Remove an E ring at an end of the ADF pickup roller shaft and slide a plastic collar off the bracket.
4. Disengage a belt from the pulley at the other end of the shaft and remove the ADF pickup roller.
5. Remove E rings on the shaft and slide off the pulley and a metal bearing.
   [IMPORTANT]
   Don't drop a parallel pin when removing the pulley because it will be freed.

14. White Roller (Read Roller)

< Removal Procedure >

1. Remove the Upper ADF cover and open the Upper ADF unit 180°, referring to the page V-9.
2. Remove the ADF original guide (F), referring to the figure on the page V-14.
3. Remove the Read roller springs at both ends of the White roller.
4. Remove an E ring at one end of the White roller shaft and slide a metal bearing off the shaft.
5. Disengage a belt from the pulley at the other end of the shaft and remove the ADF pickup roller.
6. Remove E rings on the shaft and slide off the pulley and a metal bearing.
   [IMPORTANT]
   Don't drop a parallel pin when removing the pulley because it will be freed.



15. ADF Exit Roller

< Removal Procedure >

1. Remove the Upper ADF cover and open the Upper ADF unit 180°, referring to the page V-9.
2. Remove the ADF original guide (F), referring to the figure on the page V-14.
3. Remove an E ring at one end of the ADF exit roller shaft and slide a plastic collar off the shaft.
5. Loosen the tension of the belt on the pulley at the other end of the shaft by loosening the screw on the belt tensioner, disengage the belts from the pulley and remove the ADF exit roller.
6. Remove an E ring at the other end of the shaft and slide off the pulley and a metal bearing.
   [IMPORTANT]
   Don't drop a parallel pin when removing the pulley because it will be freed.

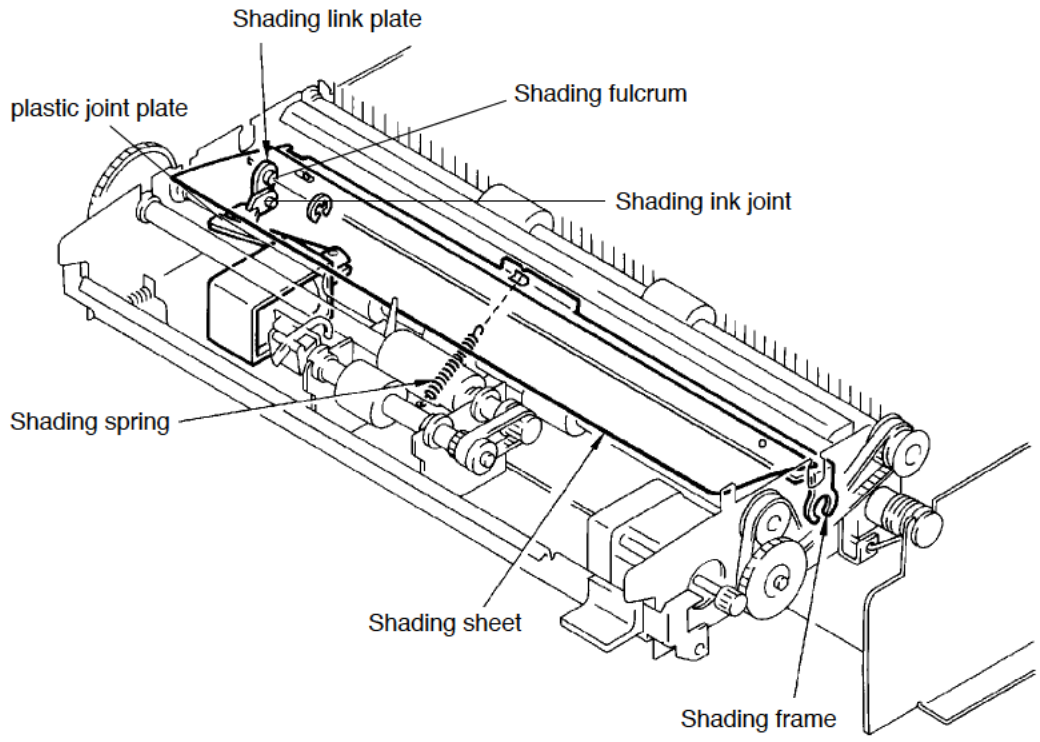
16. Shading Sheet

< Removal Procedure >

1. Remove the White roller (Read roller), referring to the previous page.
2. Remove the Shading spring.
3. Remove a plastic E ring on the Shading fulcrum, and remove the Shading link plate from the Shading fulcrum.
4. Turn the Shading frame by 180° manually and peel the Shading sheet off the Shading frame.

- Precautions In Assembly -

- Take care not to make the Shading sheet wavy when attaching it to the Shading frame because it will hinder the smooth movement of the sheet.



17. Shading Solenoid

< Removal Procedure >

1. Remove the ADF stripper roller and ADF transfer roller, referring to the pages V-13 & V-14.
2. Remove the Original feed motor from the Upper ADF unit frame and set it aside.
3. Disconnect the relay connector for the Shading solenoid, unhook the connector of the solenoid from the Upper ADF unit frame and cut the wire clamper holding the wires of the solenoid.
4. Remove an E ring securing the plastic joint plate of the plunger of the Shading solenoid.
5. Remove a C clip securing the plastic joint plate to the Shading link joint.
6. Remove two mounting screw of the Shading solenoid on the Upper ADF unit frame and take out the Shading solenoid, separating the plastic joint plate from the Shading link joint and frame shaft.

- Precautions In Assembly -

- Make sure to secure the wires of the solenoid with a wire clamper as before removal.

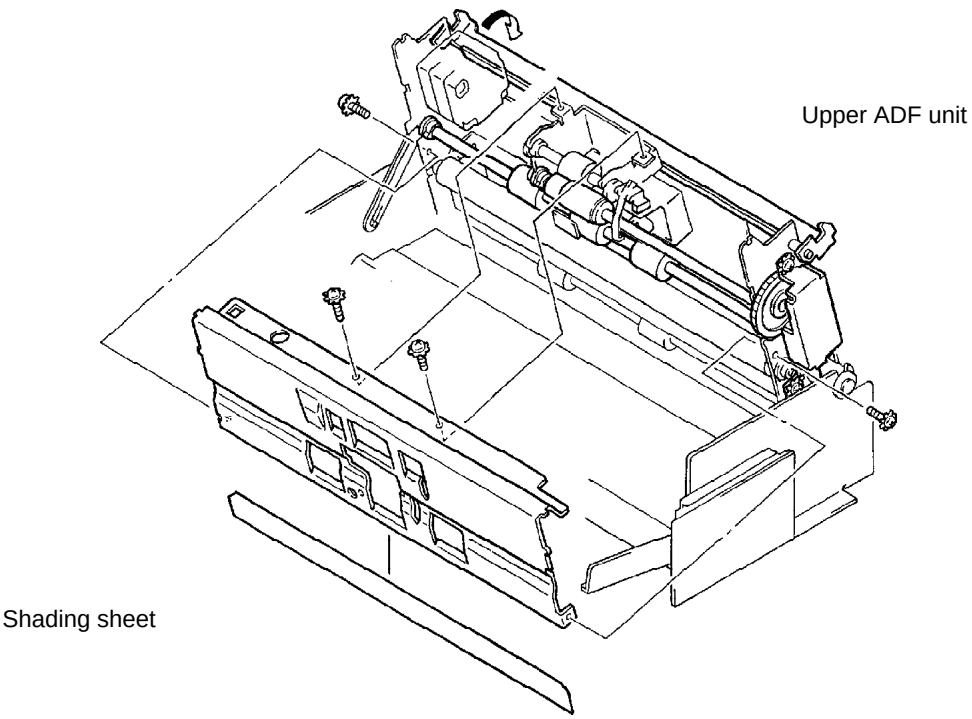
18. Shading Sheet <GR1750/1700>

< Removal Procedure >

1. Turn OFF the power and open the Upper ADF unit.
2. Remove four mounting screws on the Upper ADF cover, and remove the cover.
3. Remove four mounting screws on the ADF original guide (F), and remove the guide.
4. Peel off the Shading sheet from the ADF original guide (F), and throw away the removed sheet.

- Precautions in Assembly -

- Make sure to clean the surface of the ADF original guide (F) before placing the new Shading sheet onto the ADF original guide (F).



5. ADF Image Scanning Section

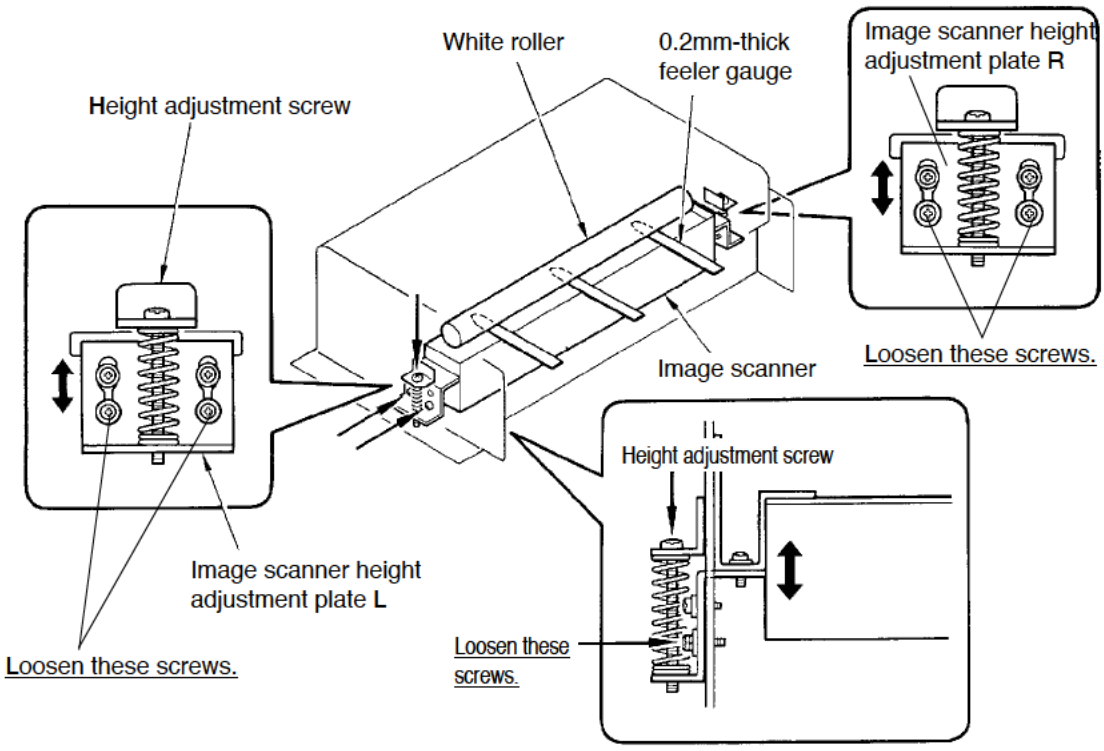
[Adjustment]

1. Gap between Image Scanner and White Roller

1. Close the Upper ADF unit.
2. Measure the space between the Image scanner and the White roller at three points, using a 0.2mm-thick feeler gauge and check that the space is 0.2mm at all points.
   [IMPORTANT]
   When measuring the space, make sure that the White roller is not pushed up by the feeler gauge, watching it.
3. If the space is either "less than 0.2mm" or "0.4mm and over", adjust the height of the Image scanner as described below.
   1) Remove the Back cover and Lower ADF cover, referring to the page V-10.
   2) Loosen the securing screws on the Image scanner height adjustment plates L and R.
      [Note]
      The Front cover must be opened to access the securing screws on the front side of the machine.
   3) Turn the Height adjustment screws above from the top to raise or lower the Image scanner.
   4) Measure the space and tighten the securing screws on the Image scanner height adjustment plates if it is confirmed that the space is 0.2mm wide.

- Results of MIsadjustment -

- If the space is too narrow;
  the Scanner glass may be scratched by the White roller, giving bad effects during image scanning. The travel of an original through the ADF unit may also be interfered.
- If the space is too wide;
  an original will float over the Image scanner, causing image distortion.

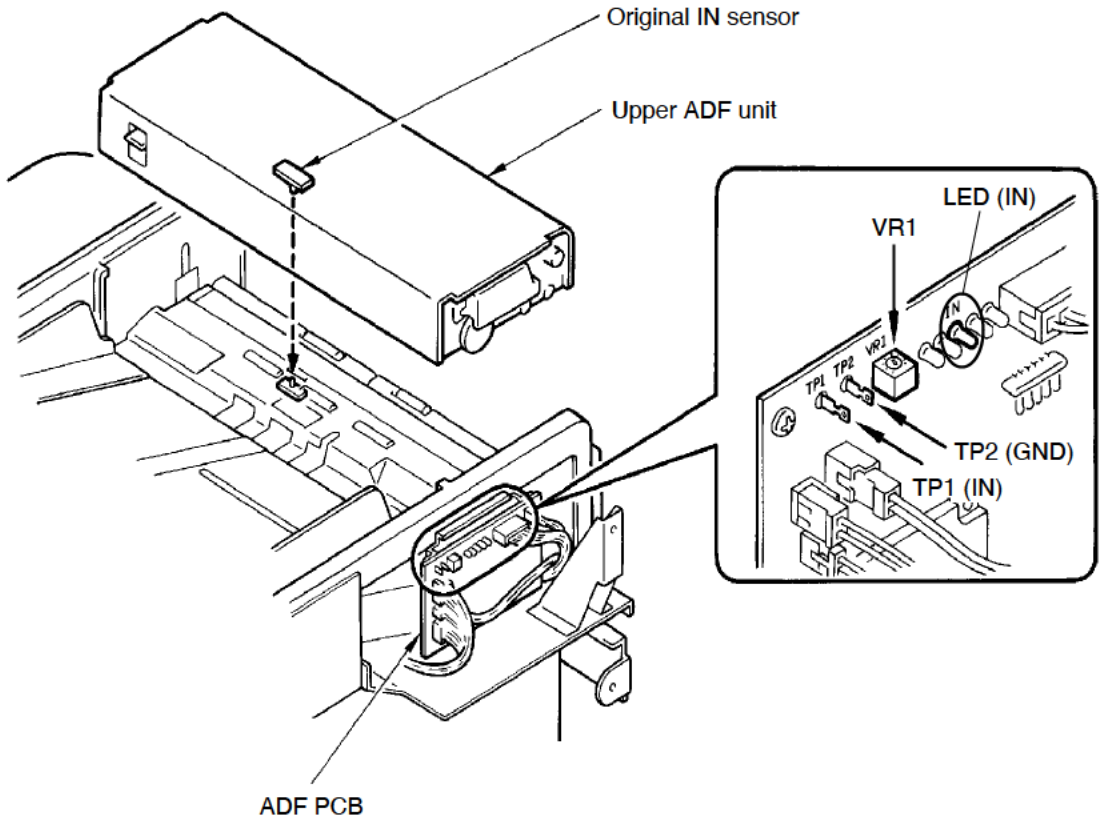


2. Sensitivity of Original IN Sensor

1. Turn OFF the power and remove the Back cover.
2. Connect a volt meter between **TP1 (IN)** and **TP2 (GND)** on the **ADF PCB**.
3. Turn ON the power and place a white sheet of paper in the light path of the Original IN sensor. The voltage should read **1.0±0.2 volts** with a sheet of paper, and **more than 3.0 volts** without the paper (the light path of the Original IN Sensor not blocked).
4. If the above voltages are not obtained, adjust the sensitivity by turning **VR1** on the **ADF PCB**.
   [Note]
   Turn VR1 clockwise to increase the sensitivity of the sensor (the voltage increases).
   The counterclockwise rotation will decrease the sensitivity (the voltage decreases).
5 Confirm that **LED (IN)** is lit on the **ADF PCB** when a white sheet of paper is placed in the light path of the Original IN sensor, and that it goes out when no paper is placed there.

- Results of MIsadjustment-

- If the sensitivity is too high;
  the Original IN sensor cannot detect an original fed to the Image scanner and the machine assumes that the original has jammed before the Image scanner.
  As a result, the error code **[E 37]** (original jam at entrance) will be displayed on the panel.
- If the sensitivity is too low;
  the machine assumes that an original jams in the ADF unit at the start of operation and the error code **[E 37]** (original jam at entrance) will be displayed on the panel.



3. Scanning Start Position

1. Make a master using an original without the top margin
2. Check the master on the Drum to confirm that the top of the image is erased by **5±2mm**.
   [Note]
   Printouts can be used to check the above, but remember that the intent here is not the measurement of the top margin of the printouts, but the amount of image that is erased at the top of the original.
3. If the erased amount is more or less than **5±2mm**, use Memory SW **No.86** (Test mode No.86) to make correction.
4. When Memory SW **No. 86** is selected, the display on the panel will show **0 86**.
   The first digit "**0**" indicates a Memory SW setting.
5. Use the PRINT POSITION button < or > on the operation panel to select a desired Memory SW setting number, referring to the chart below.
   For instance, if Memory SW setting number **9** needs to be selected, press the PRINT POSITION button until the display shows **9 86**.
6. **To input a selected Memory SW setting into the memory, press the STOP button and then the ALL RESET button.**
   The panel display returns to an ordinary indication.

- Precautions in Adjustment -

- The once-input Memory SW setting can not be erased even if Test mode **No.90** or **97** is activated or when the System ROM is replaced.
- The Memory SW setting is erased when the **System PCB** is replaced or when Test mode **No.98** is applied. In this case, all other Memory SW settings will also be erased.

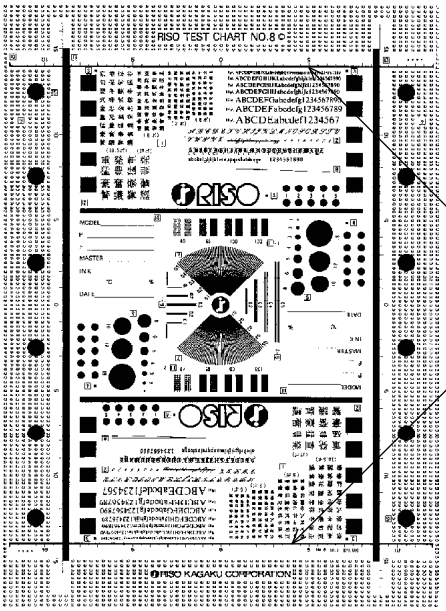
Setting No.	0	1	2	3	4	5	6	7
Pulses	0	+6	+13	+19	+25	+31	+38	+44
Adjustable Range (mm)	±0.0	+0.2	+0.4	+0.6	+0.8	+1.0	+1.2	+1.4
	8	9	A	B	C	D	E	F
	+50	-44	-38	-31	-25	-19	-13	-6
	+1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2

4. Image Elongation/Shrinkage Correction

1. Make a master at **[1:1]** size using **Test chart No.8** and make prints.
2. Compare printouts with the test chart original.
   Check that the difference in image size is **within 4mm** in the area between the top and bottom scaled lines, between the printouts and the test chart original.
3. If it is elongated or shrunk **by 4mm or more**, compared to the original size, make corrections by turning the Hex SW **(SW3)** on the **Image processing PCB**, referring to the chart below.
   [IMPORTANT]
   Be sure to turn OFF the machine each time the Hex SW is turned to update the memory.

- Precautions in Adjustment -

- There may be more than one reason for elongation or shrinkage of printed image.
  Mechanical causes, i.e. backward tension on the master roll, wear of the Write roller, loose screws in the pulleys, etc. should also be checked.



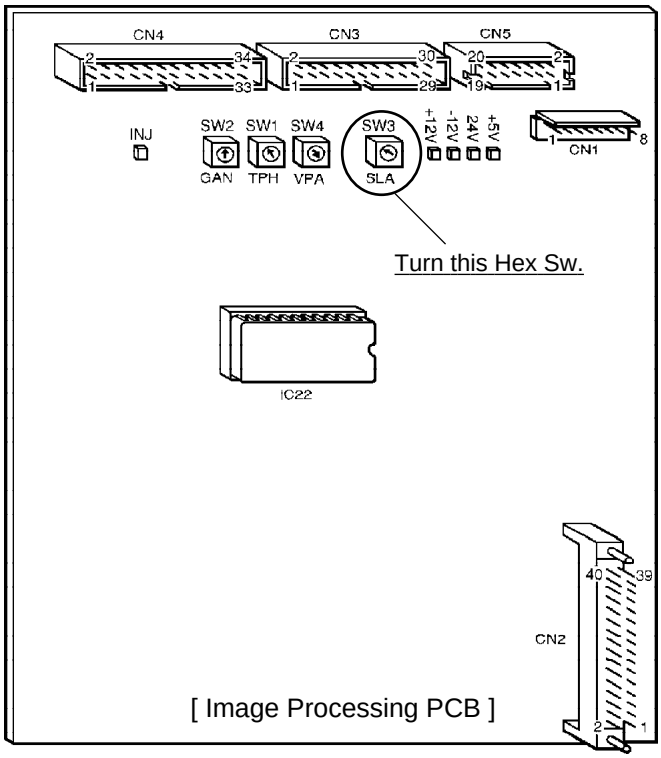
[Test Chart No.8]

← Elongates — | — Shrinks →

SW Setting	5	6	7	8	9	A	B	C
Adjustable Range (mm)	+3	+2	+1	0	-1	-2	-3	-4

* The switch should be set at between **5 ~ C** only.

Check the area between these scaled lines.



5. Horizontal Scanning Position

1. Make a master at **[1:1]** size using **Test chart No.8** and make prints.
2. Check if all "e" marks on both sides of the test chart original appear on the master on the Drum.
3. If not, adjust the horizontal scanning position by Memory SW **No.83** (Test mode No.83), referring to the chart below.
   [IMPORTANT]
   - If all "e" marks can't be recovered by the Memory switch adjustment, change the installation position of the Image scanner if possible.
   - In RA4900, if "e" marks on both sides are missing in a large area, check the installation position of the **Paper size potentiometer** under the Paper feed tray, referring to the page I-17, and the **Master making width adjustment**, referring to the page VII-15.

- Precautions in Adjustment -

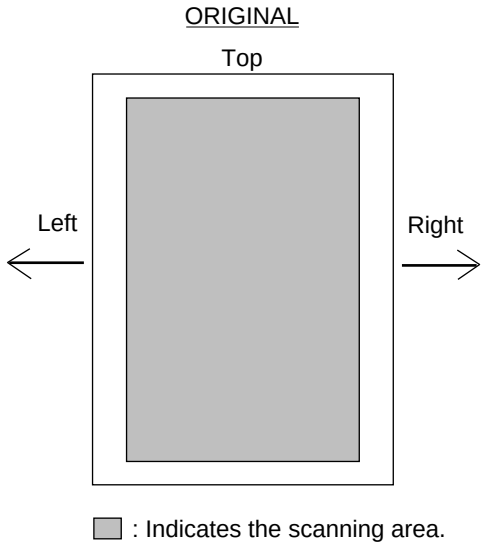
- The once-input Memory SW setting can not be erased even if Test mode **No.90** or **97** is activated or when the System ROM is replaced.
- The Memory SW setting is erased when the **System PCB** is replaced or when Test mode **No.98** is applied. In this case, all other Memory SW settings will also be erased.

< Memory SW No.83 >

Setting No.	Adjustable Range (mm)
9	-3.5
A	-3.0
B	-2.5
C	-2.0
D	-1.5
E	-1.0
F	-0.5
0	0
1	+0.5
2	+1.0
3	+1.5
4	+2.0
5	+2.5
6	+3.0
7	+3.5
8	+4.0

The scanning area slides to the left.

The scanning area slides to the right.



6. Flat Bed Image Scanning Section

[Theory of Operation]

1. Scanner Table Setting System

- Basic

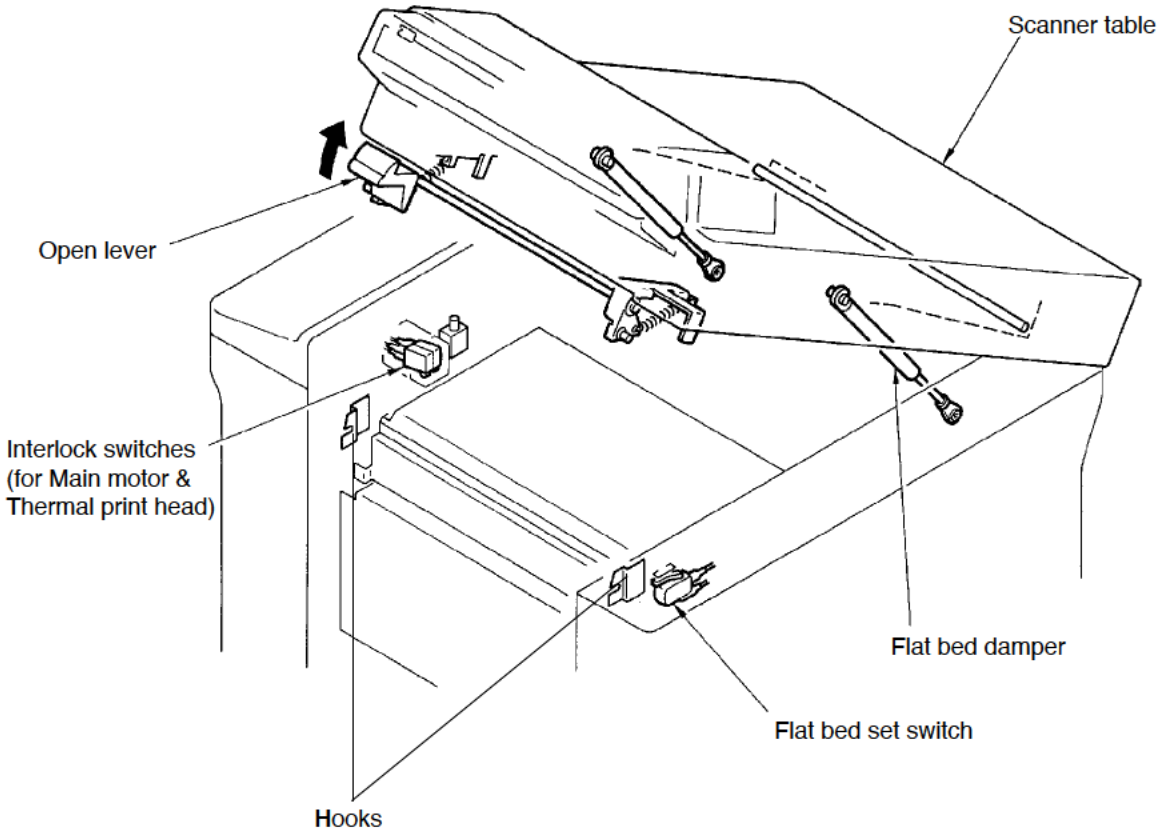
The Scanner table is pushed up by two Flat bed dampers when released from the hooks of the machine by holding the Open lever.

- Function of Flat Bed Set Switch

The Flat bed set switch detects whether the Scanner table is open or closed.
When the Flat bed set switch is released OFF, the error code **[E 56]** is displayed on the operation panel.

- Function of Interlock Switches

When the Scanner table is opened, the Interlock switches are released OFF, interrupting the power to the Main motor and Thermal print head.



2. Flat Bed Original Detection System

- Basic

When an original is placed on the Stage glass, the machine status is changed from "printing" to "master making".

- Function of Stage Cover Sensor

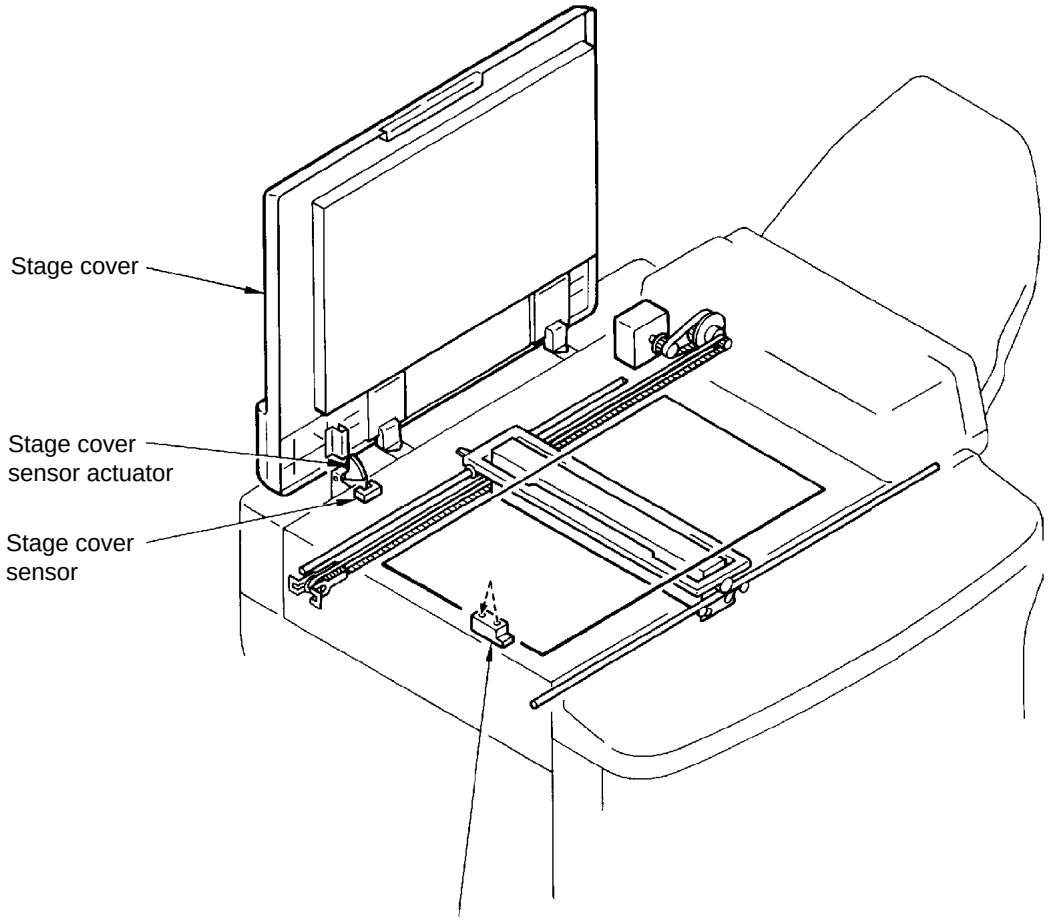
The Stage cover sensor checks whether the Stage cover is open or closed by checking its light path.

The light path of the sensor is blocked by the Stage cover sensor actuator when the Stage cover is closed more than halfway down.

- Function of Flat Bed Original Detection Sensor

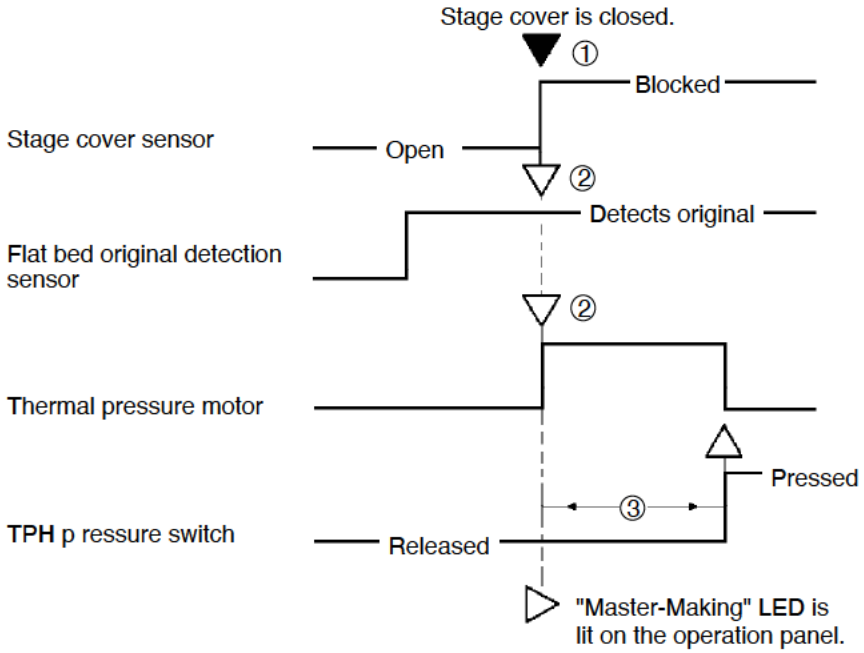
When the light path of the Stage cover sensor is blocked, the Flat bed original detection sensor checks for the presence of an original on the Stage glass.

When the sensor detects an original on the Stage glass, the "Master-Making/Print" LED on the operation panel is changed from "Print" to "Master-Making" and the Thermal pressure motor is activated to lower the Thermal print head until the TPH pressure switch is pressed.



- Timing Chart -

Flat Bed Original Detection System



① FB-ADF Original detection sensor is not pressed. (Refer to the page VI-12.)
Both the ADF switch and Flat bed set switch are pressed.
② When the Flat bed original detection sensor detects an original, the Thermal presssure motor is activated to lower the Thermal print head until the TPH pressure switch is pressed.
③ If the TPH pressure switch is not pressed **within 4 seconds** after the TPH pressure motor is activated, it is assumed that the Thermal presssure motor has been locked and the error code **[E 19]** is displayed.

3. Image Scanner Initial Movement System

- Conditions for Image Scanner Initial Movements

The Image scanner makes either of the two initial movements mentioned below in the following cases:

Initial Movement 1

1) The power is turned ON or "ALL RESET button is pressed without originals on the ADF tray and with the Book processing feature set inactive as the initial setting by the User mode.
2) The Book processing feature is cancelled.

Initial Movement 2

1) The power is turned ON or "ALL RESET button is pressed with originals on the ADF tray or with the Book processing feature set active as the initial setting by the User mode.
2) The ADF original detection sensor is actuated ON by placing originals on the ADF tray.
3) The Book processing feature is selected.

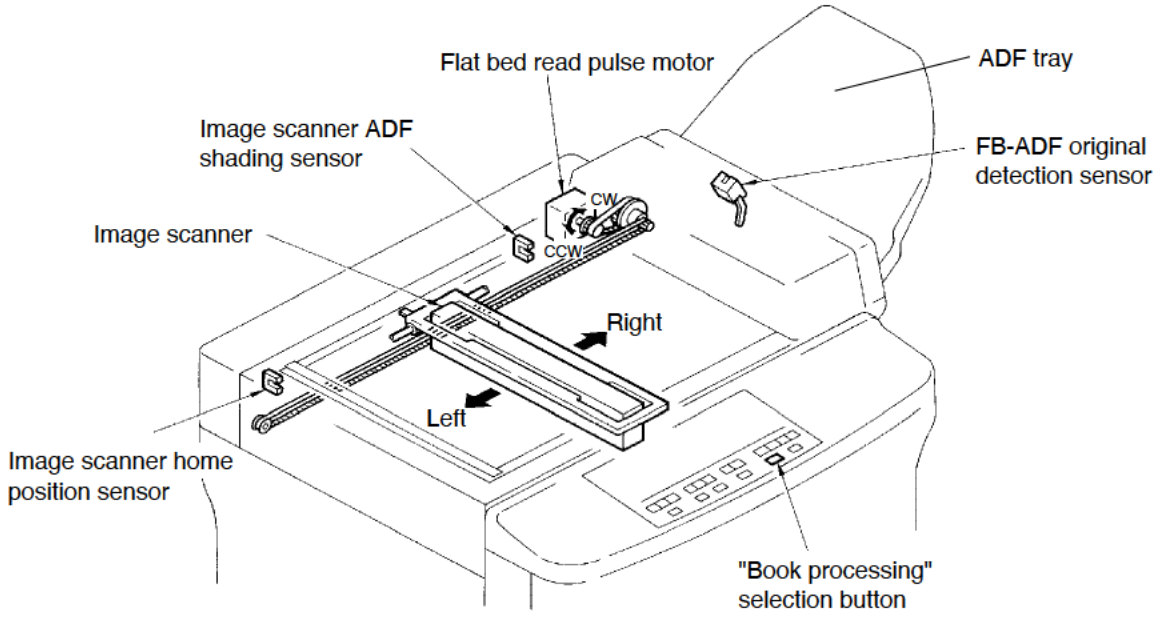
- Image Scanner Initial Movement 1

(i) If the Image scanner home position sensor is not detecting the bracket of the Image scanner, the Flat bed read pulse motor is activated to transfer the Image scanner to the left until the sensor detects the bracket.
(ii) If the sensor is detecting the bracket, the Image scanner stays still.

- Image Scanner Initial Movement 2

(i) If the Image scanner ADF shading sensor and Image scanner home position sensor are not detecting the bracket of the Image scanner, the Flat bed read pulse motor is activated to transfer the Image scanner to the left.
- If the Image scanner ADF shading sensor detects the bracket of the Image scanner **within 2204 pulses** after the Flat bed read pulse motor is activated, it is assumed that the Image scanner is located under the ADF unit and the Flat bed read pulse motor is stopped.
- If not, it is assumed that the Image scanner is located outside the ADF unit and the Flat bed read pulse motor starts to reverse after **10msec.** rest, to move the Image scanner to the right until the Image scanner ADF shading sensor detects the bracket of the Image scanner.

(ii) If the Image scanner home position sensor is detecting the bracket of the Image scanner, the Flat bed read pulse motor is activated to transfer the Image scanner to the right until the ADF shading sensor detects the bracket.
(iii)If the ADF shading sensor is detecting the bracket, the Image scanner stays still.



- Timing Chart -

Image Scanner Initial Movement (1)

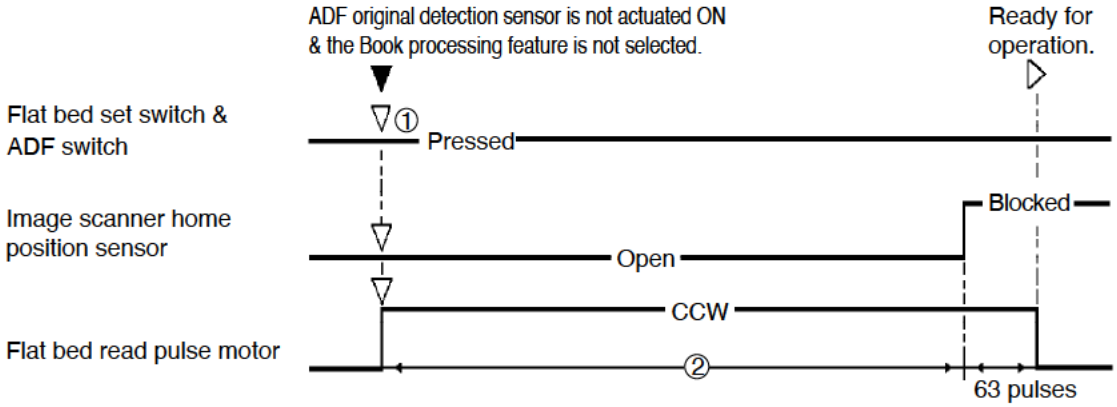
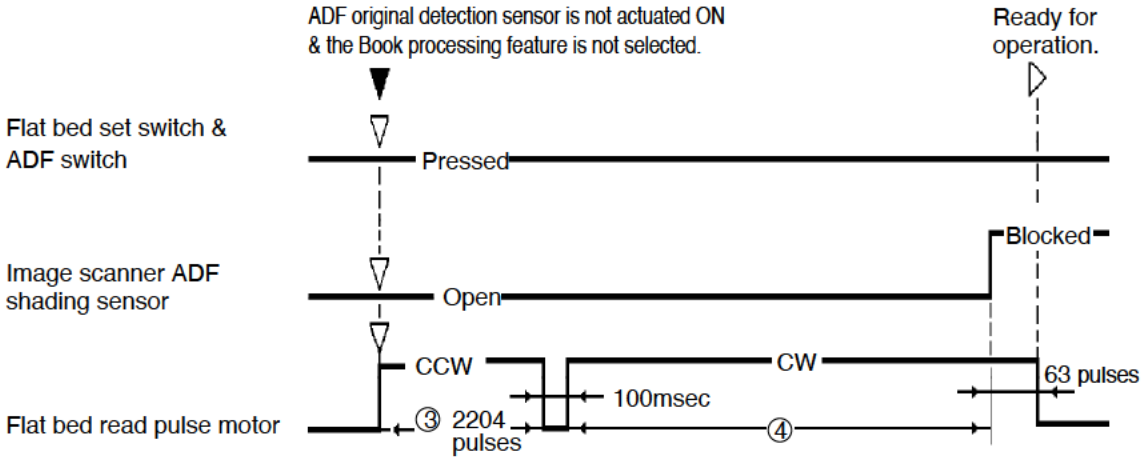


Image Scanner Initial Movement (2)



① If the Flat bed set switch is not pressed, the error code **[E 56]** is displayed.
If the ADF switch is not pressed, the error code **[E 59]** is displayed.

② If the Image scanner home position sensor does not detect the bracket of the Image scanner **within 18898 pulses** after the Flat bed read pulse motor is activated (CCW), it is assumed that the Flat bed read pulse motor has benn locked and the error code **[E 15]** is displayed.

③ If the Image scanner ADF shading sensor has detected the bracket of the Image scanner **within 2204 pulses** after the Flat bed read pulse motor is activated (CCW), the Flat bed read pulse motor is stopped after making additional **63-pulses** turns(CCW).
If the Image scanner home position sensor has detected the bracket of the Image scanner **within 2204 pulses** after the Flat bed read pulse motor is activated (CCW), the Flat bed read pulse motor rests for **100msec.**, and then reverses rotation (CW).

④ If the Image scanner ADF shading sensor has not detected the Image scanner **within 15748 pulses** after the Flat bed read pulse motor reverses rotation (CW), it is assumed that the Flat bed read pulse motor has been locked and the error code **[E 15]** is displayed.

4. Image Scanning System - Without Book Processing Feature & ADF

- Basic

The Image scanner is located at the Image scanner home position sensor, and the scanning starts after the shading compensation is made.

- Start of Image Scanning

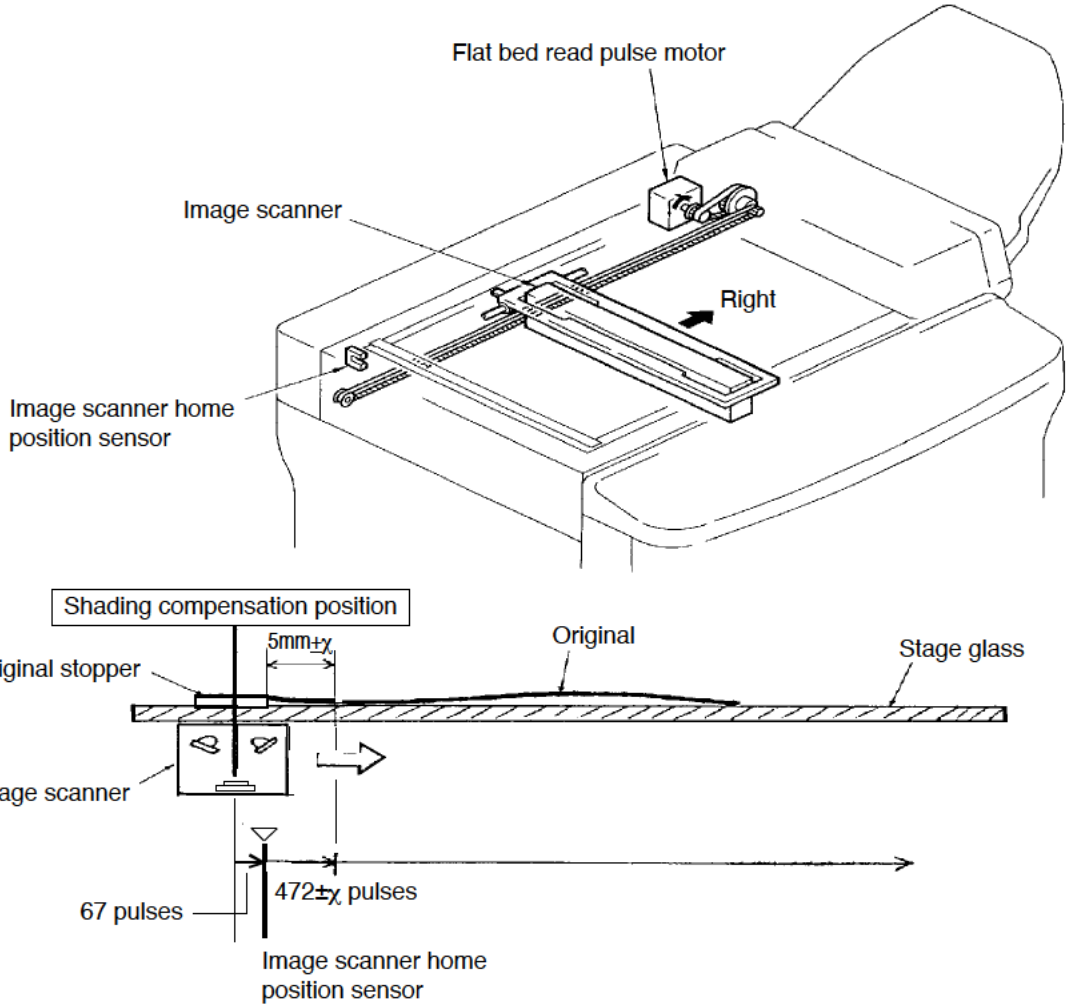
By placing an original on the Stage glass and pressing the START button, the LEDs of the Image scanner are turned ON and the shading compensation is made.
200msec later, the Flat bed read pluse motor is activated to move the Image scanner to the right.
472 pulses after the Image scanner goes off the Image scanner home position sensor, the Read & Write start signal is turned ON and the image scanning starts.
At the same time, the Master making and Master removal processes take place.

- End of Image Scanning

When a master is made for the size of the paper on the Paper feed tray, the Read & Write start signal and the Flat bed read pulse motor are turned OFF to end the image scanning process.
When the Read & Write start signal is turned OFF, the master making process is also finished and a new-made master starts to be loaded on the Drum after confirming that a used master has been removed completely.

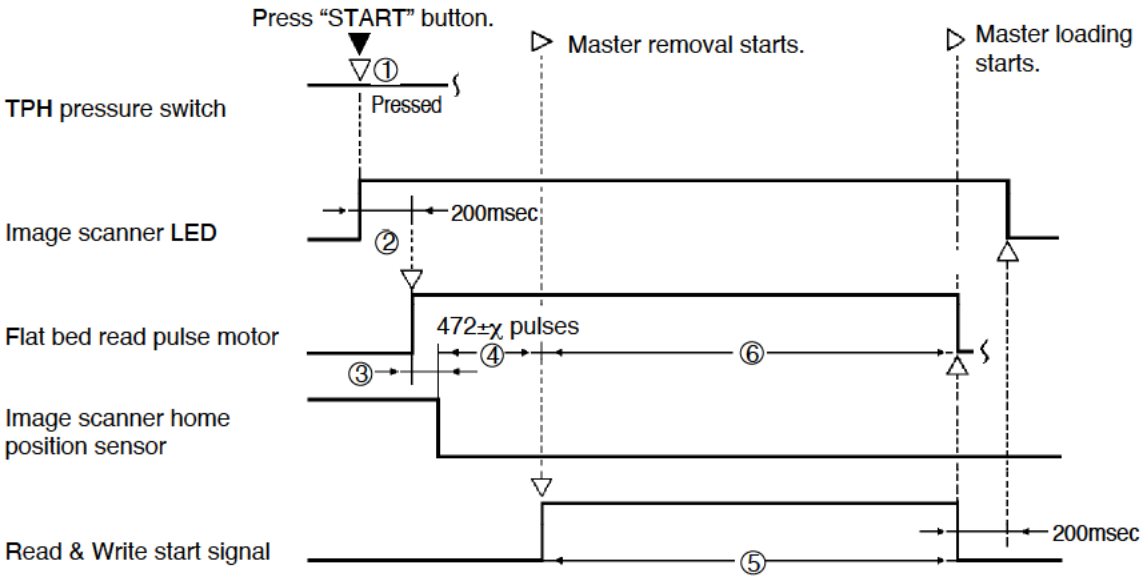
- Return to Home of Image Scanner

200msec after the Read & Write start signal is turned OFF, the LEDs of the Image scanner are turned OFF and the Flat bed read pulse motor starts to reverse rotation to return the Image scanner to the home position (at the Image scanner home position sensor).



- Timing Chart -

Image Scanning System - Without Book Processing Feature & ADF



① If the TPH pressure switch is not pressed, the Thermal pressure motor is rotated until the switch is pressed.
The image scanning starts only after the TPH pressure switch is pressed.
② The shading compensation is made automatically when the LEDs of the Image scanner are turned ON.
③ If the Image scanner has not gone off the Image scanner home position sensor **within 314 pulses** after the Flat bed read pulse motor is activated, i.e. the light path of the sensor has not been opened, it is assumed that the Flat bed read pulse motor has been locked and the error code **[E 15]** is displayed on the operation panel.
④ The "χ" pulse can be increased or decreased by Memory switch **No.87**.
⑤ The Read & Write start signal is turned OFF when a master is made for the size of the paper on the Paper feed tray.
⑥ If Read & Write start signal has not been turned OFF **within 13701 pulses** after it is turned ON, the signal and the LEDs of the Image scanner are turned OFF compulsively.

5. Pre-Scanning System - With Book Processing Feature & Without ADF

- Basic

The Image scanner is located at the Image scanner ADF shading sensor, and the pre-scanning starts after the shading compensation is made.

- Start of Pre-Scanning (Check of Original Size)

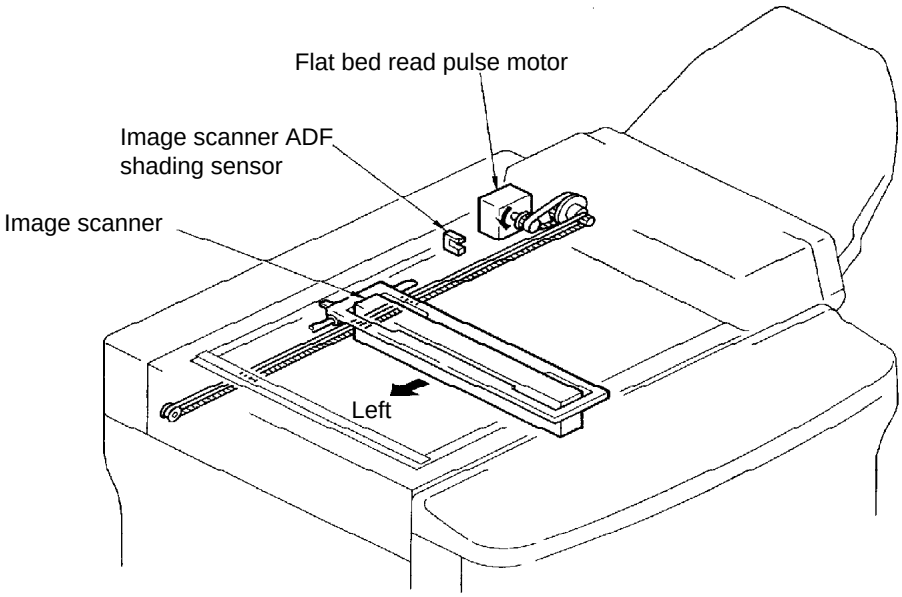
By placing an original on the Stage glass and pressing the START button, the LEDs of the Image scanner are turned ON and the shading compensation is made.

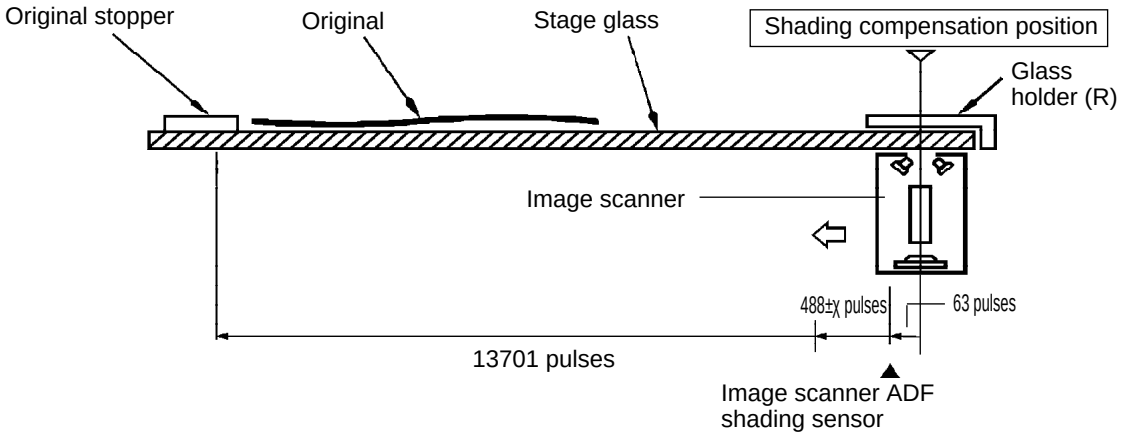
200ms later, the Flat bed read pulse motor is activated to move the Image scanner to the left.

488 pulses after the Image scanner goes off the Image scanner ADF shading sensor, the Image scanner starts to scan the original to find its size before scanning images.

- End of pre-Scanning

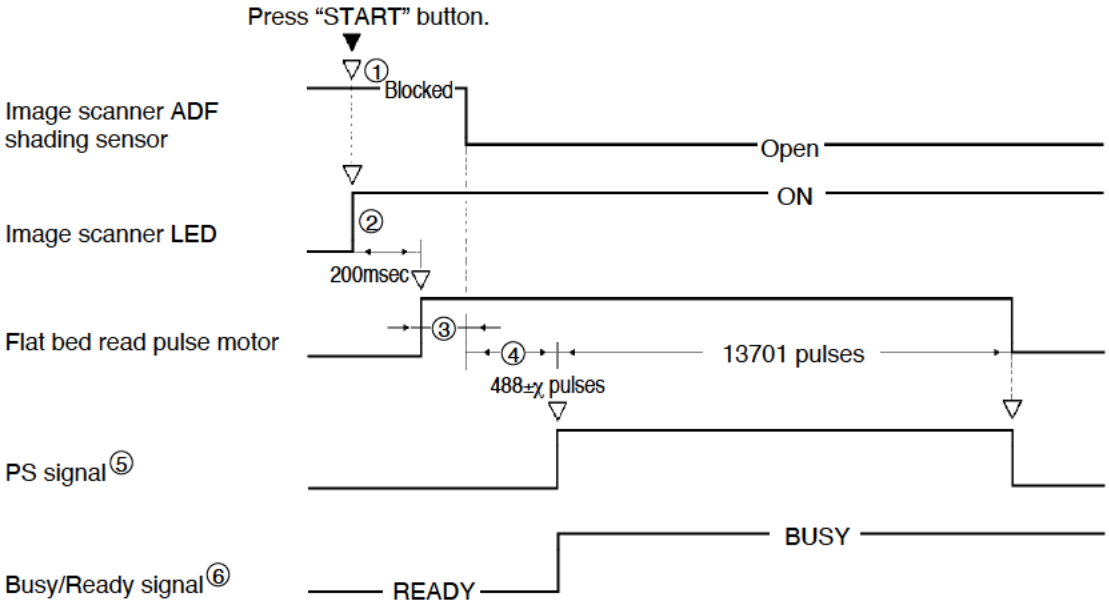
13701 pulses later, the Flat bed read pulse motor is deactivated to finish the pre-scanning operation and the image scanning process is started.





- Timing Chart -

Pre-Scanning System - With Book Processing Feature & Without ADF



① If the Image scanner ADF shading sensor is not detecting the bracket of the Image scanner, the Image scanner is moved to the ADF home position to set the Image scanner ready for the pre-scanning process.
② The Shading compensation is made automatically when the LEDs of the Image scanner are turned ON.
③ If the Image scanner has not gone off the Image scanner ADF shading sensor **within 314 pulses** after the Flat bed read pulse motor is activated, it is assumed that the Flat bed read pulse motor has been locked and the error code **[E 15]** is displayed on the operation panel.
④ The"χ" pulse can be increased or decreased by Memory switch **No.82**.
⑤ The PS signal is the command to confirm the size of the original, which is output from the Image processing PCB to the Trimming PCB.
⑥ "Busy" signal is output from the Trimming PCB to the Image processing PCB while the Trimming PCB is calculating and confirming the original size.

6. Image Scanning System - With Book Processing Feature & Without ADF

- Basic

After the pre-scanning is finished, the Image scanner starts to scan images when the Image scanner reaches the Image scanner home position sensor.

The Shading compensation is already made at the beginning of the pre-scanning process.

- Start of Image Scanning

When the pre-scanning is finished and the original size is calculated, the Flat bed read pulse motor is activated to move the Image scanner to the right.

When the Flat bed read pulse motor rotates by a given number of pulses, which is given as a result of the original size calculation, the Read & Write start signal is turned ON, leading the Image scanner to start scanning images.

At the same time, the Master making and Master removal processes take place.

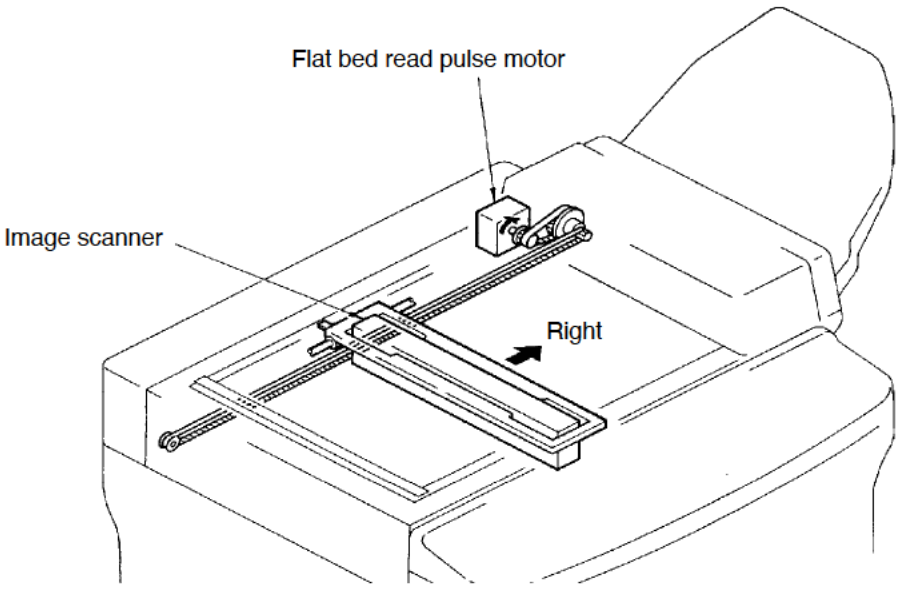
- End of Image Scanning

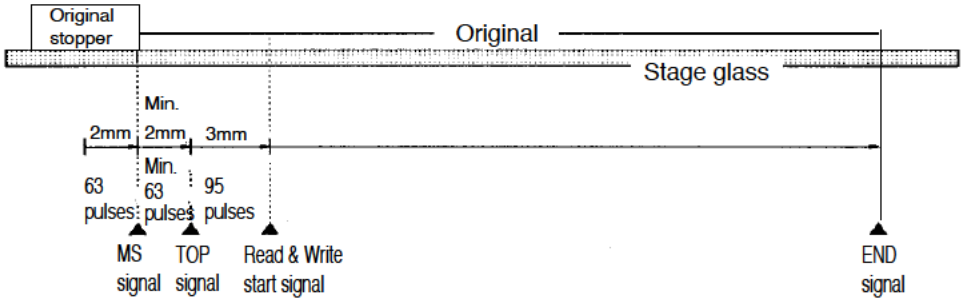
When images are scanned for the calculated size of the original or if a master is made for the size of the paper on the Paper feed tray, the Read & Write start signal and the Flat bed read pulse motor are turned OFF to end the image scanning process.

When the Read & Write start signal is turned OFF, the master making process is also finished and a new-made master starts to be loaded on the Drum after confirming that a used master has been removed completely.

- Return to Home of Image Scanner

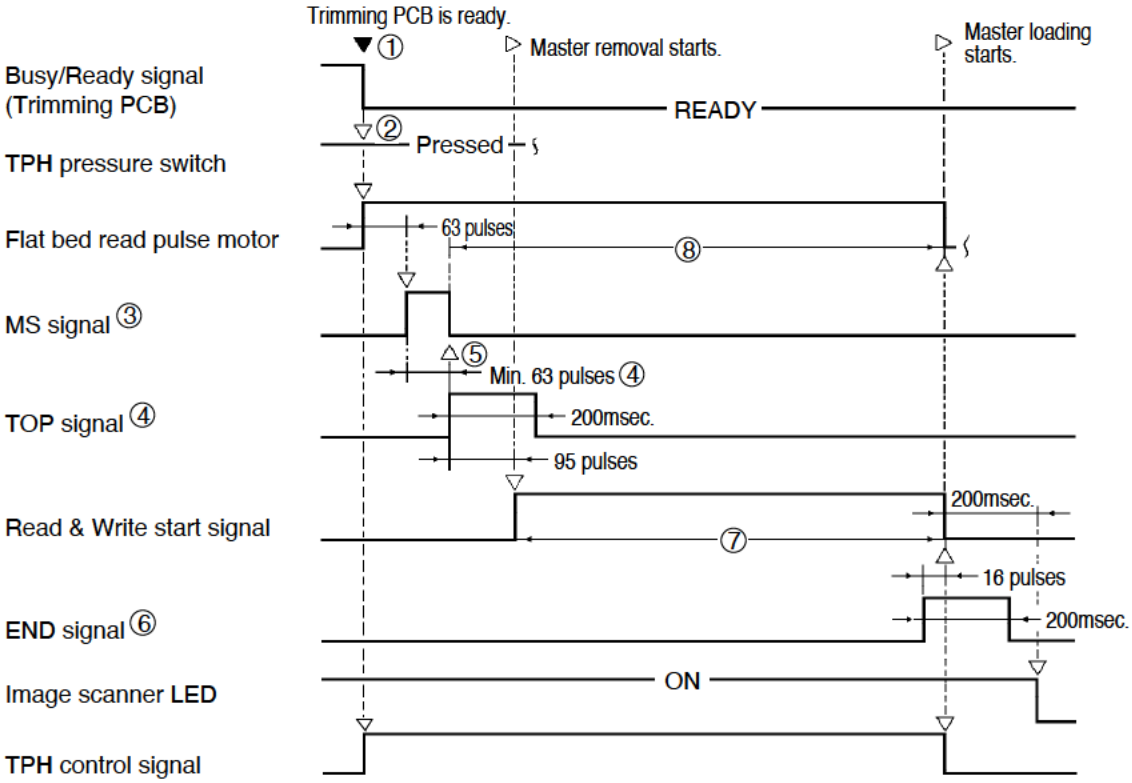
200msec after the Read & Write start signal is turned OFF, the LEDs of the Image scanner are turned OFF and the Flat bed read pulse motor restarts rotating to return the Image scanner to the home position for the Book processing feature (at the Image scanner ADF shading sensor).





- Timing Chart -

Image Scanning System - With Book Processing Feature & Without ADF



① The image scanning starts when the Busy/Ready signal of the Trimming PCB becomes "Ready".
② The image scanning starts only after the TPH pressure switch is pressed ON.
If the TPH pressure switch is not pressed ON, the Thermal pressure motor is rotated until the switch is pressed.
③ The MS signal is the signal to start image scanning, which is output from the Image processing PCB to the Trimming PCB.
④ The TOP signal is the signal to identify the top position of the original confirmed during the pre-scanning process, which is output from the Trimming PCB to the Image processing PCB.
The TOP signal is output from the Trimming PCB **63 ~ 158 pulses** after the MS signal is received by the Trimming PCB.
The start position of image writing (master making) is automatically compensated, even though an original is misplaced away from the Original stopper on the Stage glass, if the lead edge remains **within 3mm** from the Original stopper.
⑤ If the TOP signal has not been output **within 315 pulses** after the the MS signal is output, it is assumed that the Trimming PCB is faulty and the error code **[E 10]** is displayed on the panel.
⑥ The END signal is the signal indicating the tailing edge of the original which is confirmed during the pre-scanning process. It is output from the Trimming PCB to the Image processing PCB.
⑦ If the Write pulse motor has rotated for the size of the paper on the Paper feed tray, the Read & Write start signal and the LEDs of the Image scanner are turned OFF even before the END signal is output.
⑧ After the MS signal is output, if the END signal has not been output **within 13701 pulses** after the Flat bed read pulse motor is activated, the Read & Write start signal and the LEDs of the Image scanner are turned OFF, and a new-made master starts to be loaded on the Drum.

7. ADF Original Loading System

- Basic

An original is loaded into the ADF unit via the FB-ADF motor and waits until the "START" button is pressed to start the image scanning operation.

- Start of Original Loading

When originals are set in the ADF unit, they push the actuator out of the FB-ADF original detection sensor.

2 seconds later, the FB-ADF pickup solenoid is energized and lifts the FB-ADF pickup pad, raising the originals against the FB-ADF pickup roller (upper) via Pickup solenoid arm.

200ms later, the FB-ADF motor is energized to turn the FB-ADF pickup roller (upper) and ADF stripper roller (via ADF gear and belt).

- Pickup of One Original

As the FB-ADF stripper is pressed against the ADF stripper roller by the Stripper arm spring, one original is separated and fed into the ADF unit by rotation of the ADF stripper roller.

The original pushes the actuator out of the Original registration sensor, and **200ms** later, the FB-ADF pickup solenoid and FB-ADF motor are turned OFF.

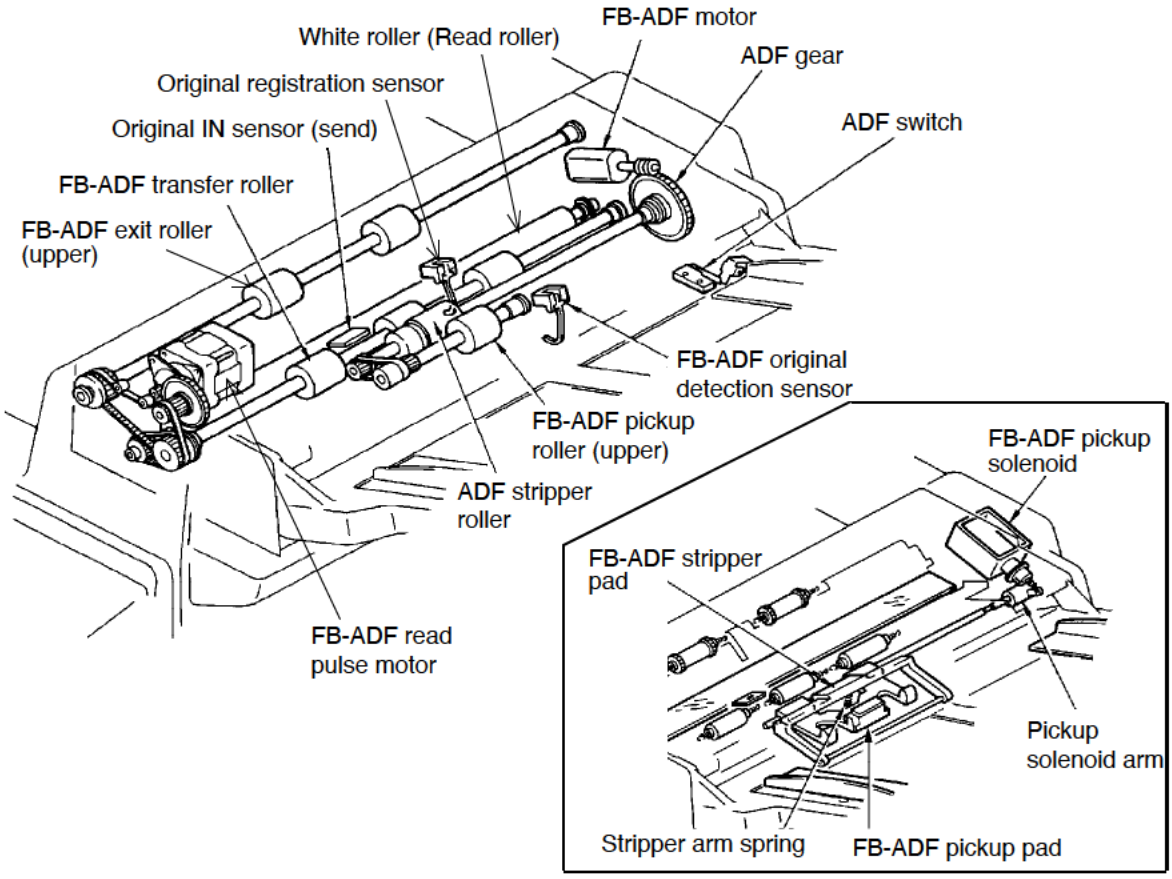
10ms later, the FB-ADF read pulse motor is activated to turn the FB-ADF transfer roller, White roller (Read roller) and FB-ADF exit roller (upper) via pulleys and belts.

- Finish of Original Loading

The FB-ADF read pulse motor is turned OFF **778 pulses** after the leading edge of the original blocks the light path of the Original IN sensor.

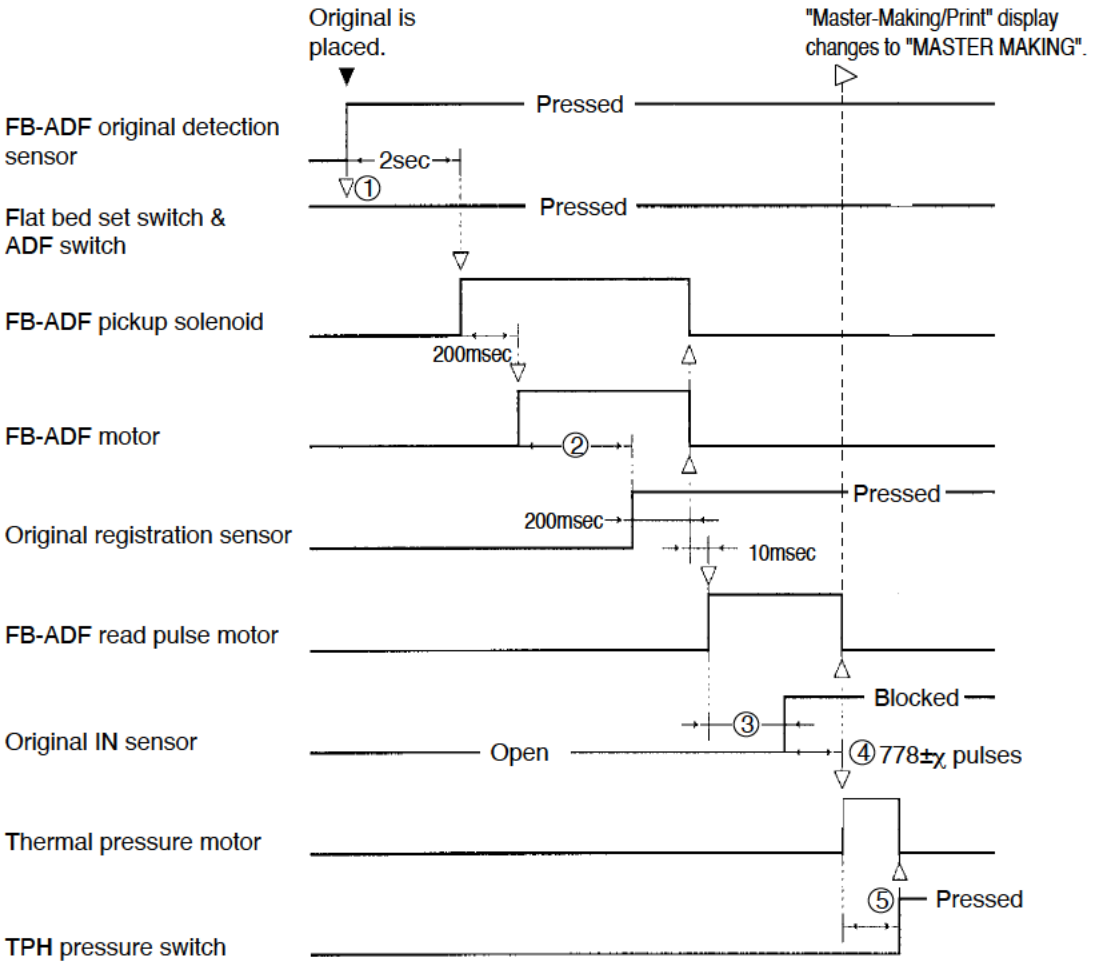
- Change of Panel Display & Preparation for Master Making

The "Master-Making/Print" display on the operation panel is changed from "PRINT" to "MASTER MAKING". At the same time, the Thermal pressure motor is activated to lower the Thermal print head until the TPH pressure switch is pressed.



- Timing Chart -

ADF Original Loading System



① The Flat bed set switch and ADF switch should be actuated ON to activate the FB-ADF original detection sensor.
② If the Original registration sensor has not detected an original **within 1.35 seconds** after the FB-ADF motor is activated, the machine assumes the original has misfed and indicates the error code **[E 36]**.
③ If the Original IN sensor has not detected an original **within 630 pulses** after the FB-ADF read pulse motor is activated, the machine assumes the original has jammed at the ADF entrance and indicates the error code **[E 37]**.
④ The adjustment of "χ" pulses is possible by using the Memory switch **No.86**.
⑤ If the TPH pressure switch has not been actuated ON **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has been locked and indicates the error code **[E 19]**.

* After the original loading is finished, the image scanning starts when the "START" button is pressed.

8. ADF Image Scanning System

- Shading Compensation

When the "START" button is pressed, after the original has been set in position, the LEDs of the Image Scanner are turned ON and the shading compensation is made.
200ms later, the Flat bed read pulse motor is activated, leading the Image scanner to the position for image scanning under the ADF unit.

- Start of Scanning

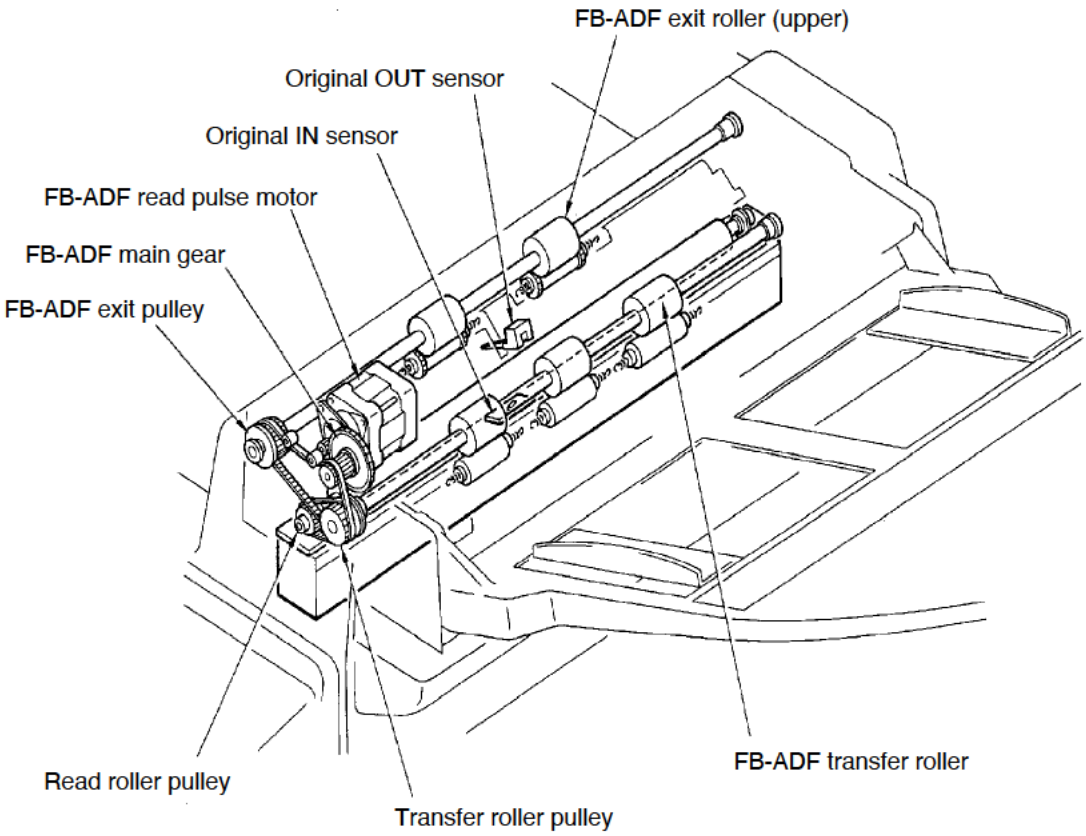
After the Image scanner slides out of the Image scanner ADF shading sensor, the Flat bed read pulse motor rotates **1811 pulses** more and then stops with the Image scanner positioned for image scanning.
At the same time, the FB-ADF read pulse motor is activated to feed the original by rotating the FB-ADF transfer roller and FB-ADF exit roller via pulleys and belt, and the Read & Write start signal is turned ON to start the scanning of the original.

- Finish of Scanning

The original proceeding through the ADF unit opens the light path of the Original OUT sensor by pushing the actuator out of the sensor.
When the original advances further and its trailing edge passes through the Original IN sensor and opens its light path, **278 pulses** later, the Read & Write start signal is turned OFF to end the scanning of the original.

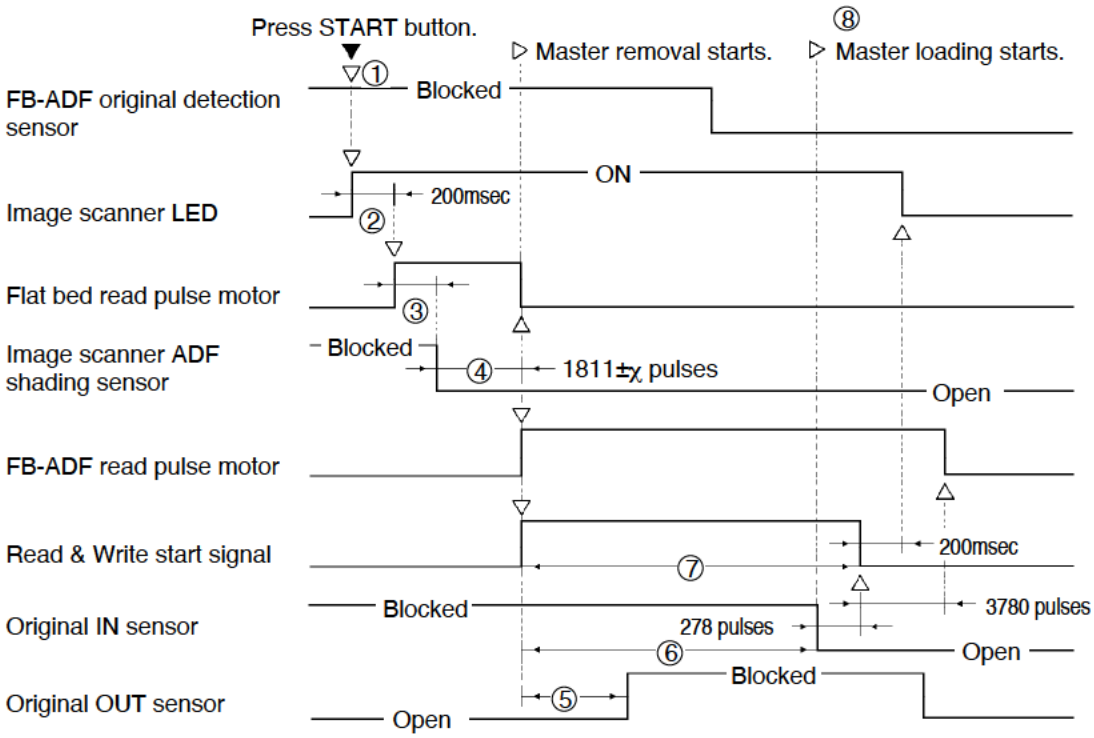
- Ejection of the Original

The FB-ADF read pulse motor is rotated further for **3780 pulses** after the Read and Write start signal is turned OFF to finish the transportation of the original out of the ADF unit.



- Timing Chart -

ADF Image Scanning System



① The "START" button cannot be activated until an original is completely loaded in the ADF.
② The shading compensation starts when the LED arrays of the Image scanner are turned ON.
③ If the Image scanner has not slided out of the Image scanner ADF shading sensor **within 314 pulses** after the Flat bed read pulse motor is activated, it is assumed that Flat bed read pulse motor has been locked and the error code **[E 15]** is displayed on the operation panel.
④ The adjustment of "χ" pulses is possible by using the Memory switch **No.81**.
⑤ If the Original OUT sensor has not detected an original **within 1890 pulses** after the FB-ADF read pulse motor is activated, it is assumed that the original has jammed at the exit of ADF and the error code **[E 39]** is displayed on the operation panel.
⑥ If the Original IN sensor keeps detecting an original **for 14803 pulses** after the FB-ADF read pulse motor was activated, the machine assumes the original has jammed or is oversized and indicates the error code **[E 38]** on the operation panel.
⑦ The Read & Write start signal is turned OFF **278 pulses** after the trailing edge of the original clears out of the Original IN sensor, or when the Write pulse motor has rotated for the size of paper on the Paper feed tray.
⑧ When the trailing edge of the original clears out of the Original IN sensor, a new-made master starts to be loaded on the Drum after confirming that a used master is completely removed from the Drum.
If the Read & Write start signal is turned OFF before the original clears out of the Original IN sensor, the new-made master starts to be loaded on the Drum at that time.

6. Flat Bed Image Scanning Section

[Removal and Assembly]

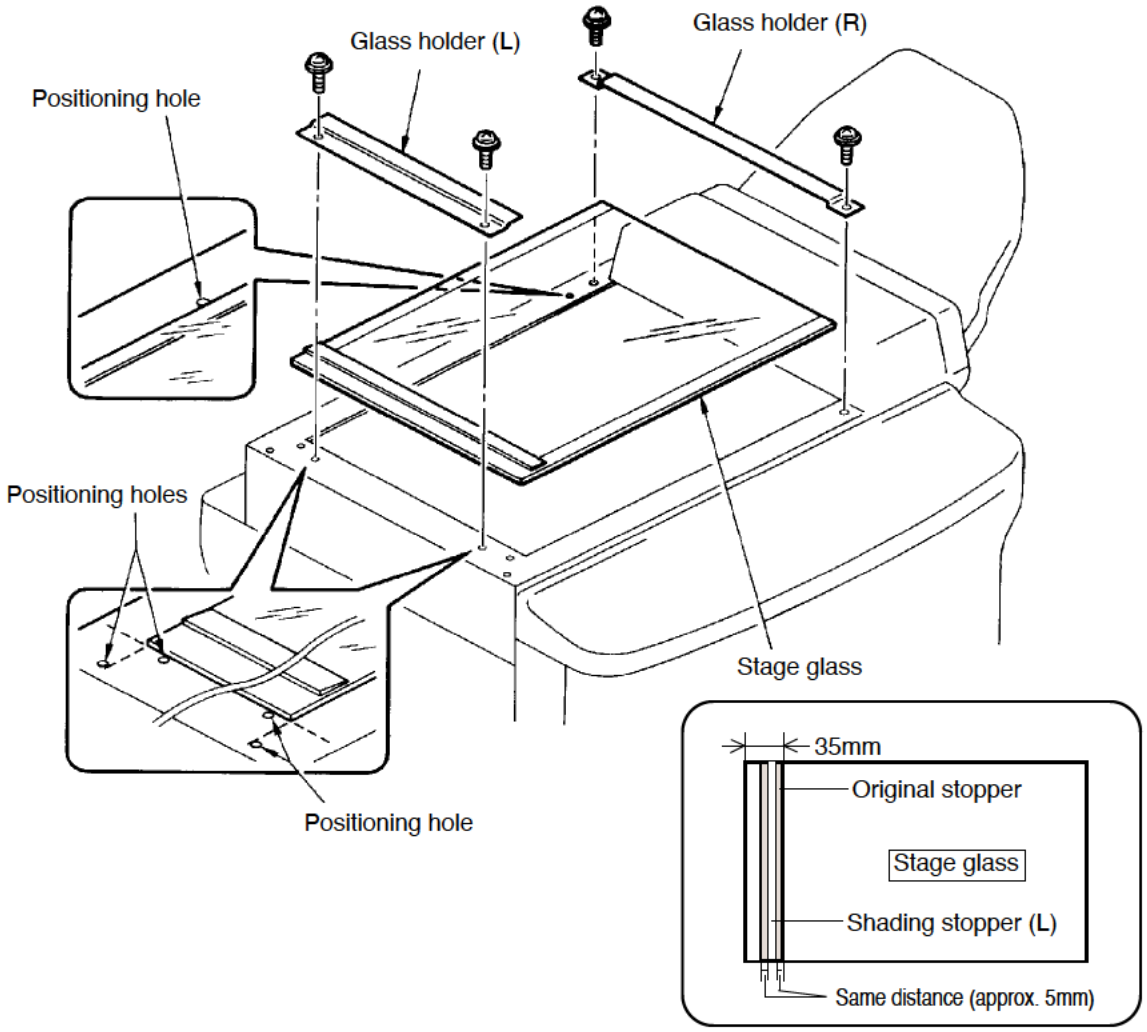
1. Stage Glass

< Removal Procedure >

1. Turn OFF the power and remove all Scanner covers (front, rear, right and left).
   [Note]
   If the machine is equipped with the ADF unit, remove the FB-ADF covers (F) and (R).
   (Refer to the page VI-23.)
2. Remove two screws each from the Glass holder (L) and Glass holder (R), and remove these two Glass holders.
3. Lift and remove the Stage glass.

- Precautions In Assembly -

- When placing the Stage glass back on the machine, touch the edges of the glass and their extended lines with the frames of the positioning holes on the Scanner table frame, as shown below.
- Do not scratch, stain or damage the Shading plate attached underneath the Glass holder (R).
- When replacing the Original stopper and Shading plate (L) underneath on the Stage glass, attach them on the Stage glass as shown in the figure below.



2. Image Scanner

< Removal Procedure >

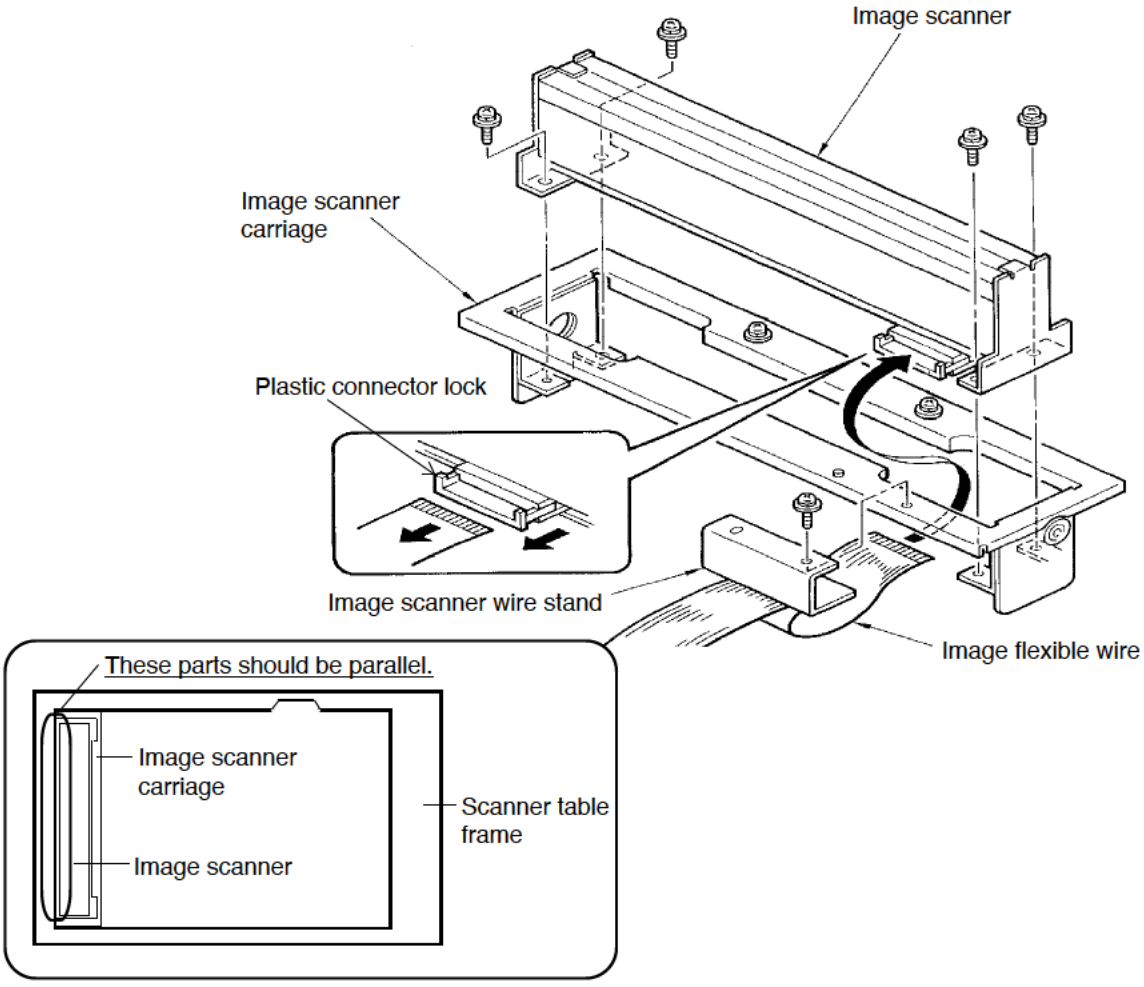
1. Turn OFF the power and remove the Stage glass, referring to the previous page.
2. Shift the Image scanner to reach mounting screws.
3. Remove the mounting screw on the Image scanner wire stand.
4. Slide out the plastic connector lock on the Image scanner and disconnect the Image flexible wire from the Image scanner.
5. Remove four mounting screws on the Image scanner, and take out the scanner from the Image scanner carriage, lifting it upward gently.

- Precautions In Assembly -

- Confirm that the Image scanner is installed in the Image scanner carriage, parallel to the Scanner table frame, as indicated in the figure below.
- When connecting the Image flexible wire back onto the Image scanner, slide out the plastic connector lock on the Image scanner and push it back firmly into the Image scanner together with the Image flexible wire all the way .

- Adjustments after Assembly -

- The scanning start position (Refer to the page VI-32.)
- The Image scanner ADF home position (Refer to the page VI-37.)



3. Image Scanner Carriage

< Removal Procedure >

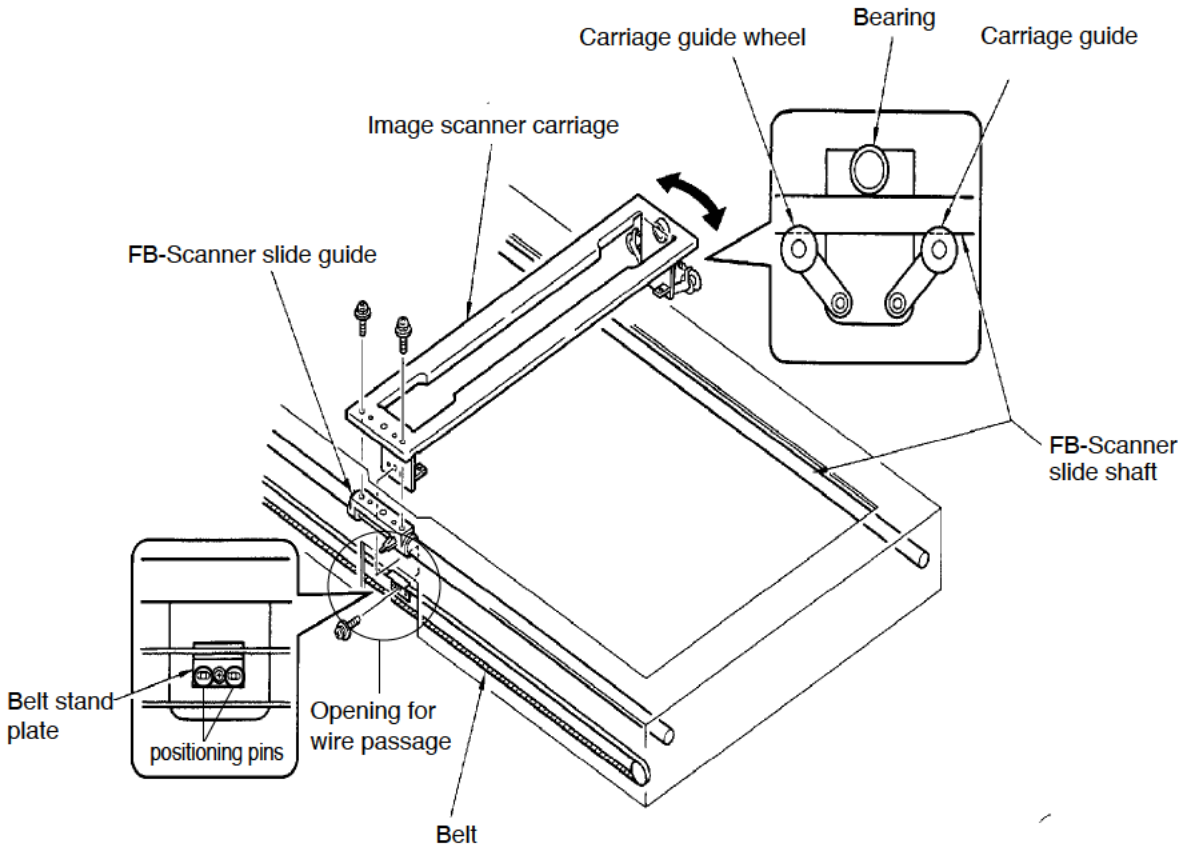
1. Turn OFF the power and remove the Image scanner, referring to the previous page.
2. Shift the Image scanner carriage to the position about at the middle of the Scanner table, where the Scanner table frame is cut to pass the Image flexible wire.
3. Remove the mounting screw on the FB-Scanner belt stand plate and free the plate from the Image scanner carriage.
4. Remove two mounting screws on the Image scanner carriage and separate the carriage from the FB-Scanner slide guide.
5. Gently rock the other end of the Image scanner carriage on the panel side horizontally and free two Carriage guide wheels from the FB-Scanner slide shaft to take out the carriage from the Scanner table.

- Precautions In Assembly -

- Match the positioning pins on the Image scanner carriage with positioning holes on the FB-Scanner belt stand plate when attaching the belt stand plate onto the carriage.
  The positioning pins can be located at any part of the holes.

- Adjustments after Assembly -

- The scanning start position (Refer to the page VI-32.)
- The Image scanner ADF home position (Refer to the page VI-37.)



4. FB-Scanner Belts

< Removal Procedure >

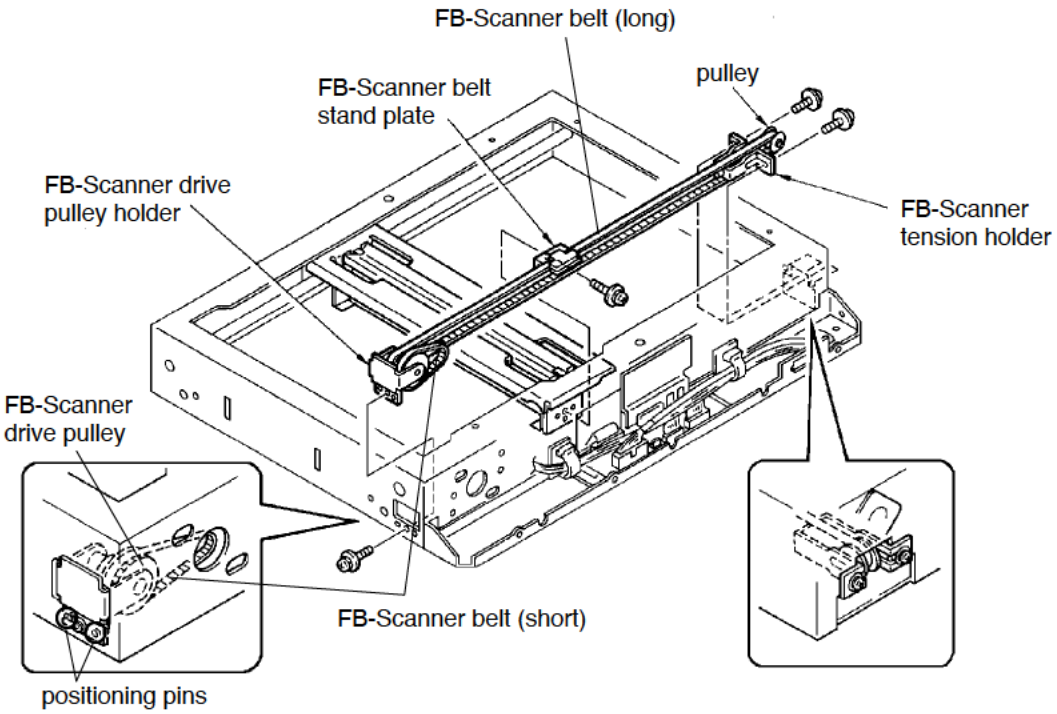
1. Turn OFF the power, and remove the FB-Scanner cover (right) by removing two mounting screws.
   [Note]
   If the machine is equipped with the ADF unit, remove the ADF unit and FB-ADF cover (right). (Refer to the page VI-23.)
2. Remove the Stage glass. (Refer to the page VI-17.)
3. Remove the Flat bed read pulse motor. (Refer to the page VI-22.)
4. Remove the mounting screw of the FB-Scanner drive pulley holder and separate the holder from the Scanner table frame.
5. Remove an E ring on one end of the FB-Scanner drive pulley shaft, pull out the shaft through the pulley and take out the pulley from the holder, disengaging the long FB-Scanner belt from it.
6. Remove the short FB-Scanner belt from the FB-Scanner drive pulley.

To remove the long FB-Scanner belt, proceed further to the steps below.

7. Remove the mounting screw of the FB-Scanner belt stand plate to free the plate from the Image scanner carriage.
8. Remove two mounting screws on the FB-Scanner tension holder, and disengage the long FB-Scanner belt from the pulley of the tension holder.
9. Remove the securing screw on the FB-Scanner belt stand plate and separate the plate from the long FB-Scanner belt.

- Precautions In Assembly -

- Match the positioning pins on the Image scanner carriage with positioning holes on the FB-Scanner belt stand plate when attaching the belt stand plate onto the carriage.
  The positioning pins can be located at any part of the holes.
- Match the positioning pins on the FB-Scanner drive pulley holder with the positioning holes on the Scanner table frame.



5. Image Flexible Wire

< Removal Procedure >

1. Turn OFF the power and remove the Stage glass. (Refer to the page VI-17.)
2. Remove the Image scanner wire stand from the Image scanner, slide out the plastic connector lock of the Image scanner and disconnect the Image flexible wire from the Image scanner. (Refer to the page VI-18.)
3. Remove the mounting screw on the Core holder and separate the Core holder and Image scanner wire stand from the Image flexible wire. Then slide the Ferite core case off the wire.
4. Remove five mounting screws on the Image flexible wire cover plate, and remove the plate.
5. Slide out the plastic connector lock on the Flat bed PCB and disconnect the Image flexible wire from the PCB.

- Precautions In Assembly -

- Secure the bent portion of the Image flexible wire to the guideline-marked position on the bottom plate of the Scanner table, meeting the side edge of the wire with the guide line.
- Confirm the wide aluminum tape on the wire is in contact with the Grounding plate.
- Make sure to place the Ferite core case on the short aluminum tape on the wire and fold down the wire at this point when securing the wire to the Image scanner wire stand, as shown below.
- When connecting the Image flexible wire back in the connector, slide out the plastic connector lock and then push it back firmly into the connector together with the Image flexible wire.

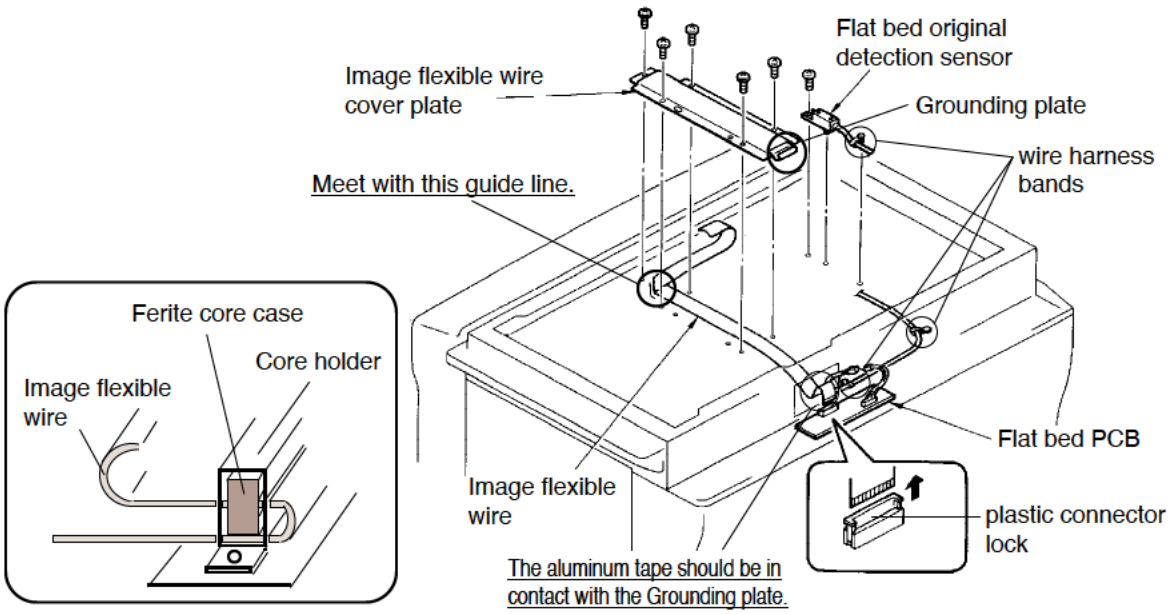
6. Flat Bed Original Detection Sensor

< Removal Procedure >

1. Turn OFF the power and remove the Stage glass. (Refer to the page VI-17.)
2. Remove the mounting screw on the Flat bed original detection sensor and cut three wire harness bands holding the sensor's wires onto the bottom plate of the Scanner table.
3. Unplug the connector of the sensor just before the Flat bed PCB and take out the sensor.

- Precautions In Assembly -

- Make sure to secure the wires of the sensor as before removal.


Flat bed original detection sensor
Image flexible wire cover plate
Grounding plate
wire harness bands
Meet with this guide line.
Ferite core case
Core holder
Image flexible wire
Flat bed PCB
Image flexible wire
plastic connector lock
The aluminum tape should be in contact with the Grounding plate.

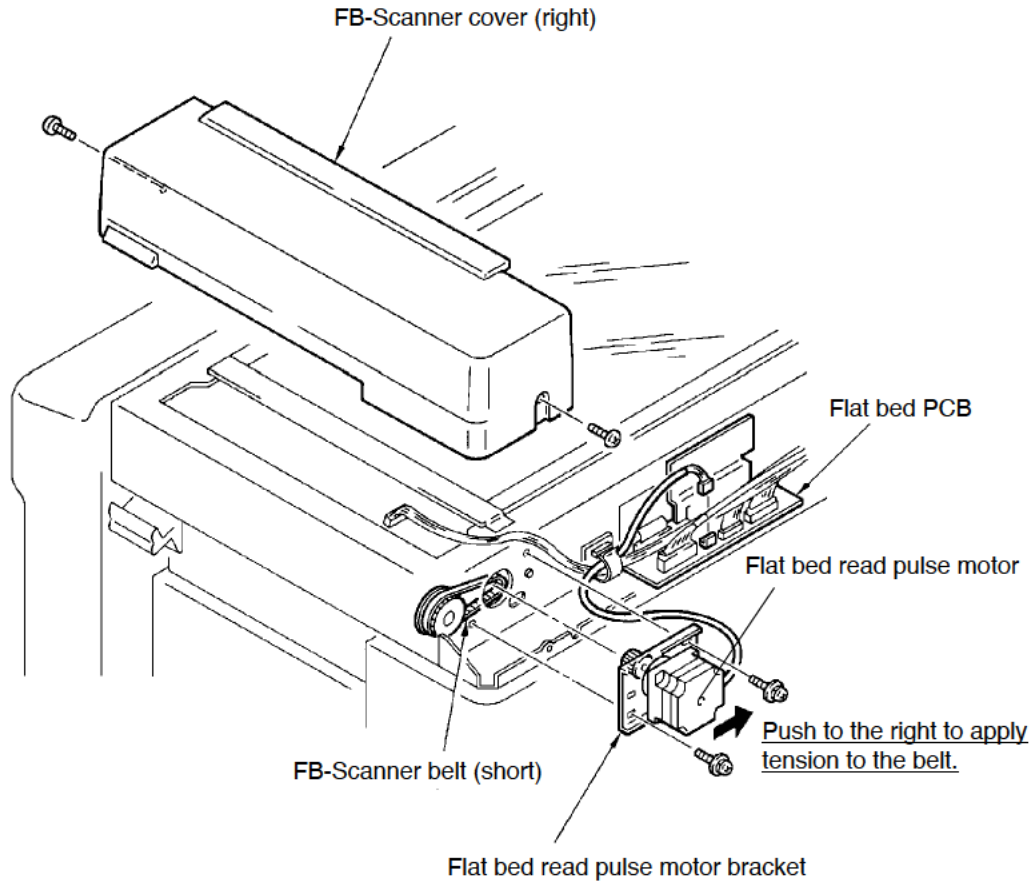
7. Flat Bed Read Pulse Motor

< Removal Procedure >

1. Turn OFF the power, and remove the FB-Scanner cover (right) by removing two mounting screws.
   [Note]
   If the machine is equipped with FB-ADF unit, remove the FB-ADF unit, referring to the page VI-23.
2. Remove two mounting screws of the Stage cover, and remove the Stage cover.
3. Unplug the connector of the Flat belt read pulse motor from **CN3** of the **Flat bed PCB**.
4. Remove two mounting screws on the Flat bed read pulse motor bracket, and remove the motor from the Scanner table frame together with the bracket.
5. Remove two mounting screws of the Flat bed read pulse motor and separate the bracket from the motor.

- Precautions In Assembly -

- When securing the motor, tighten the mounting screws, pushing the motor to the right to apply enough tension to the FB-Scanner belt (short).
- Make sure to match the positioning pins on the Scanner table frame into the positioning holes of the Flat bed read pulse motor bracket.


FB-Scanner cover (right)
Flat bed PCB
Flat bed read pulse motor
Push to the right to apply tension to the belt.
FB-Scanner belt (short)
Flat bed read pulse motor bracket

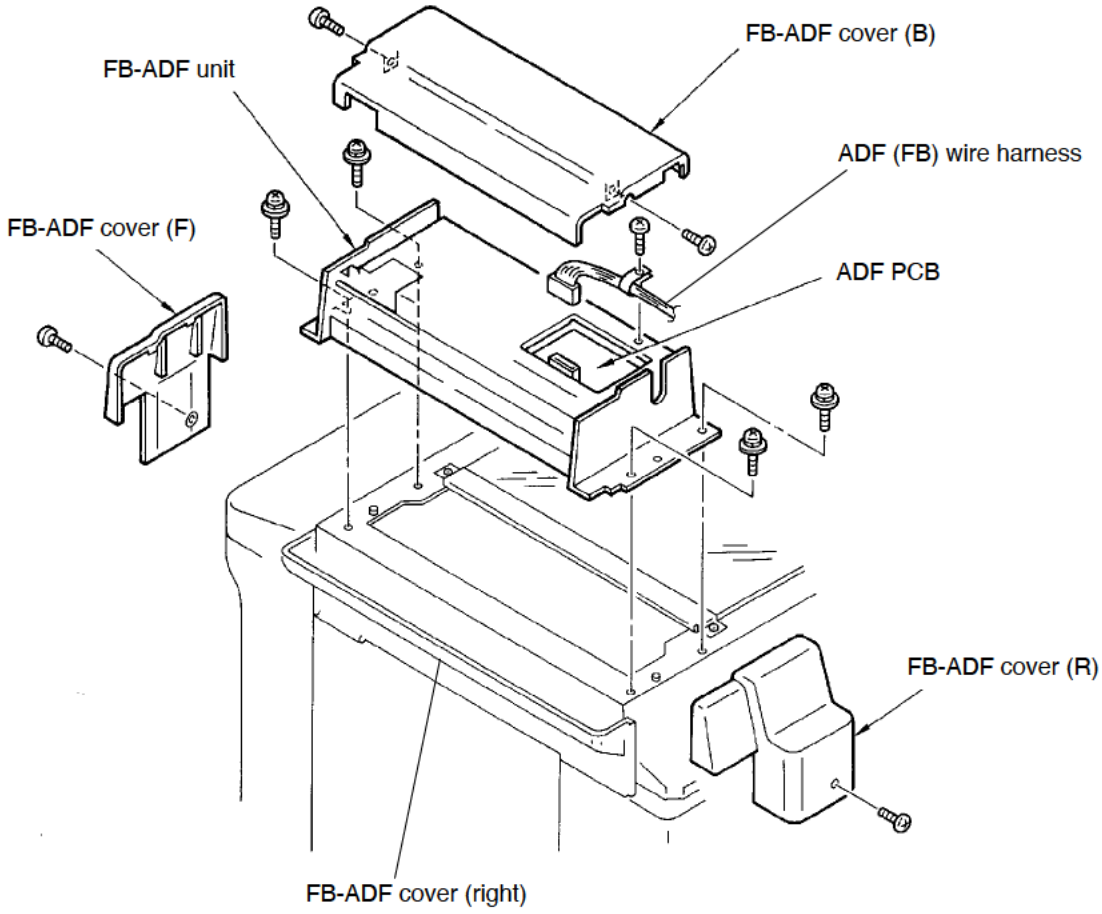
8. FB-ADF Unit

< Removal Procedure >

1. Turn OFF the power, and remove the FB-ADF covers (B), (R),and (F).
2. Remove the securing screw of the wire harness band holding the ADF (FB) wire harness and disconnect the connector of the wire harness from **CN6** of the **ADF PCB**.
3. Remove four mounting screws on the FB-ADF unit and take out the unit from the machine.

- Precautions In Assembly -

- Be careful not to damage the Stage glass.
- The FB-ADF covers (B), (R),and (F) have catching hooks.
  Be sure to hook them properly when attaching the covers back on the FB-ADF unit without pinching any wires.



9. ADF Glass
10. FB-ADF Original IN Sensor (receive)
11. ADF Switch

9. ADF Glass

< Removal Procedure >

1. Turn OFF the power and remove the FB-ADF unit from the machine, referring to the page VI-23. Turn the unit upside down.
2. Remove the mounting screws on the Image scanner glass holders (L) and (R), and remove the holders.
3. Take out the ADF glass carefully.

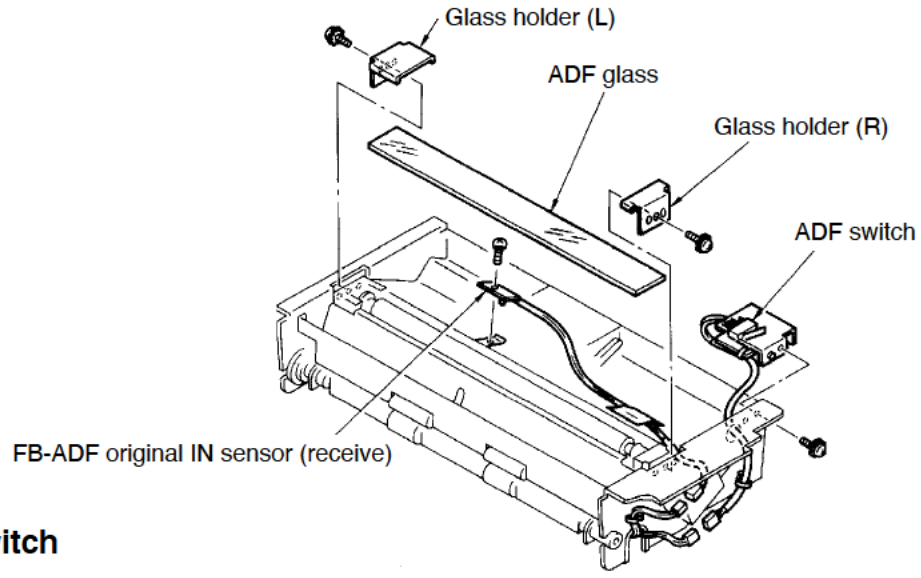
10. FB-ADF Original IN Sensor (receive)

< Removal Procedure >

1. Turn OFF the power and remove the FB-ADF unit from the machine, referring to the page VI-23. Turn the unit upside down.
2. Unplug the connector of the FB-ADF original IN sensor (receive).
3. Remove the mounting screw of the FB-ADF original IN sensor (receive), and remove the sensor from the ADF unit, peeling off the tape securing the wires of the sensor.

- Precautions In Assembly -

- Make sure to secure the wires of the sensor with a tape as before removal.



11. ADF Switch

< Removal Procedure >

1. Turn OFF the power and remove the FB-ADF unit from the machine, referring to the page VI-23. Turn the unit upside down.
2. Unplug the connector of the ADF switch and cut the wire clamper securing the wires of the switch.
3. Remove the mounting screw of the ADF switch bracket, and remove the bracket with the switch.
4. Cut the wire clamper securing the wiresof the switch to the bracket and remove two mounting screws on the switch to separate it from the bracket.

- Precautions In Assembly -

- Make sure to secure the wires of the switch with wire clampers as before removal.
- Match the positioning boss on the switch bracket with the hole on the FB-ADF unit frame.

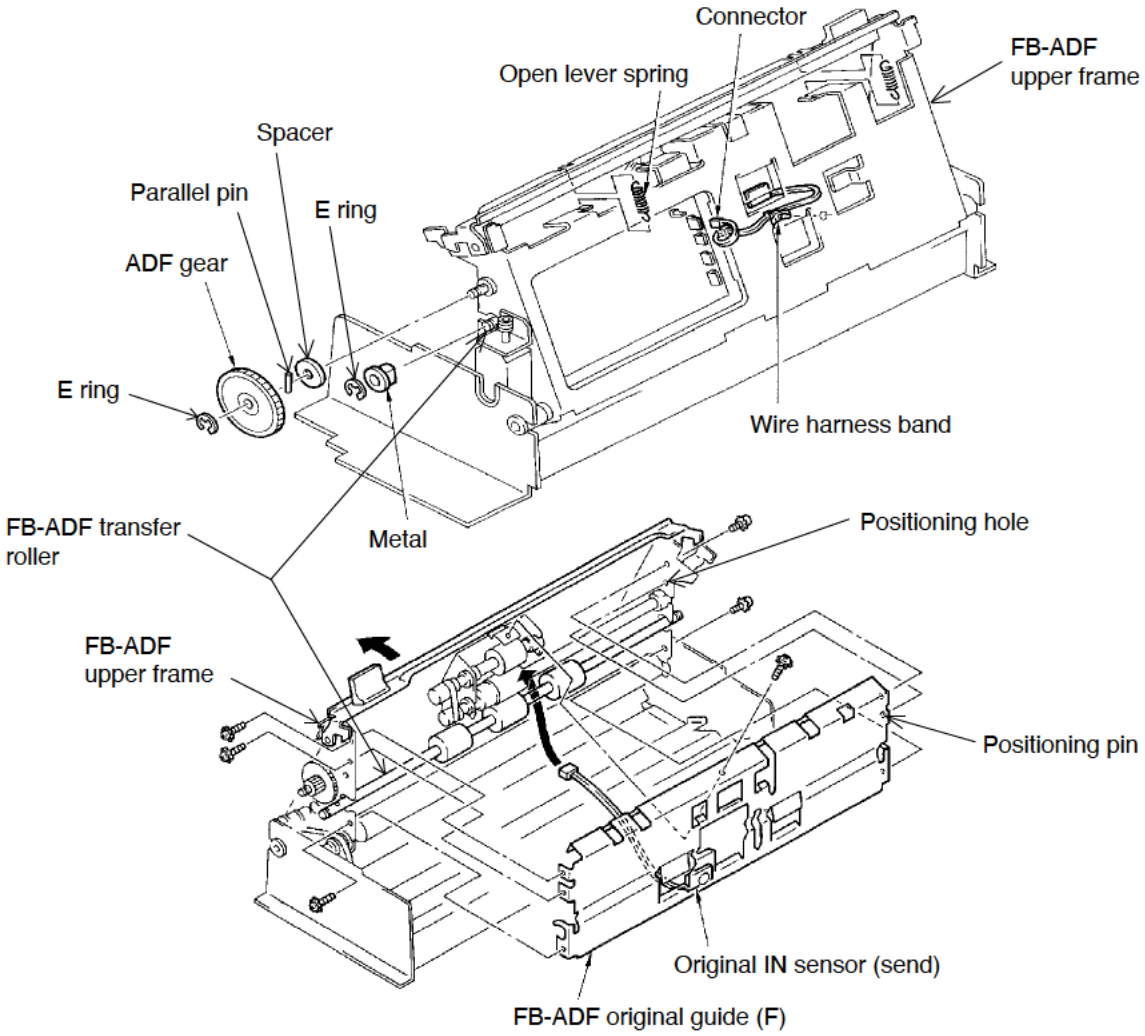
12. Original IN Sensor (send)

< Removal Procedure >

1. Turn OFF the power, and remove the FB-ADF cover (B).
2. Remove the Open lever springs (two).
3. Unplug the connector of the Original IN sensor from CN8 of the ADF PCB and pinch the Wire harness band with a pair of pliers and push it off from the FB-ADF upper frame.
4. Remove an E ring on the ADF gear and slide out the ADF gear, Parallel pin and Spacer.
   [IMPORTANT]
   Don't drop the parallel pin when removing the ADF gear because it will be freed.
5. Remove an E ring from the FB-ADF transfer roller and slide out the Metal.
6. Remove six mounting screws on the FB-ADF original guide (F) and remove the guide with the Original IN sensor attached.
7. Remove the mounting screw on the Original IN sensor (send) and remove the sensor from the FB-ADF Original guide (F).

- Precaution In Assembly -

- Make sure to fit the positioning pin on the FB-ADF Original guide (F) into the positioning hole on the FB-ADF upper frame.



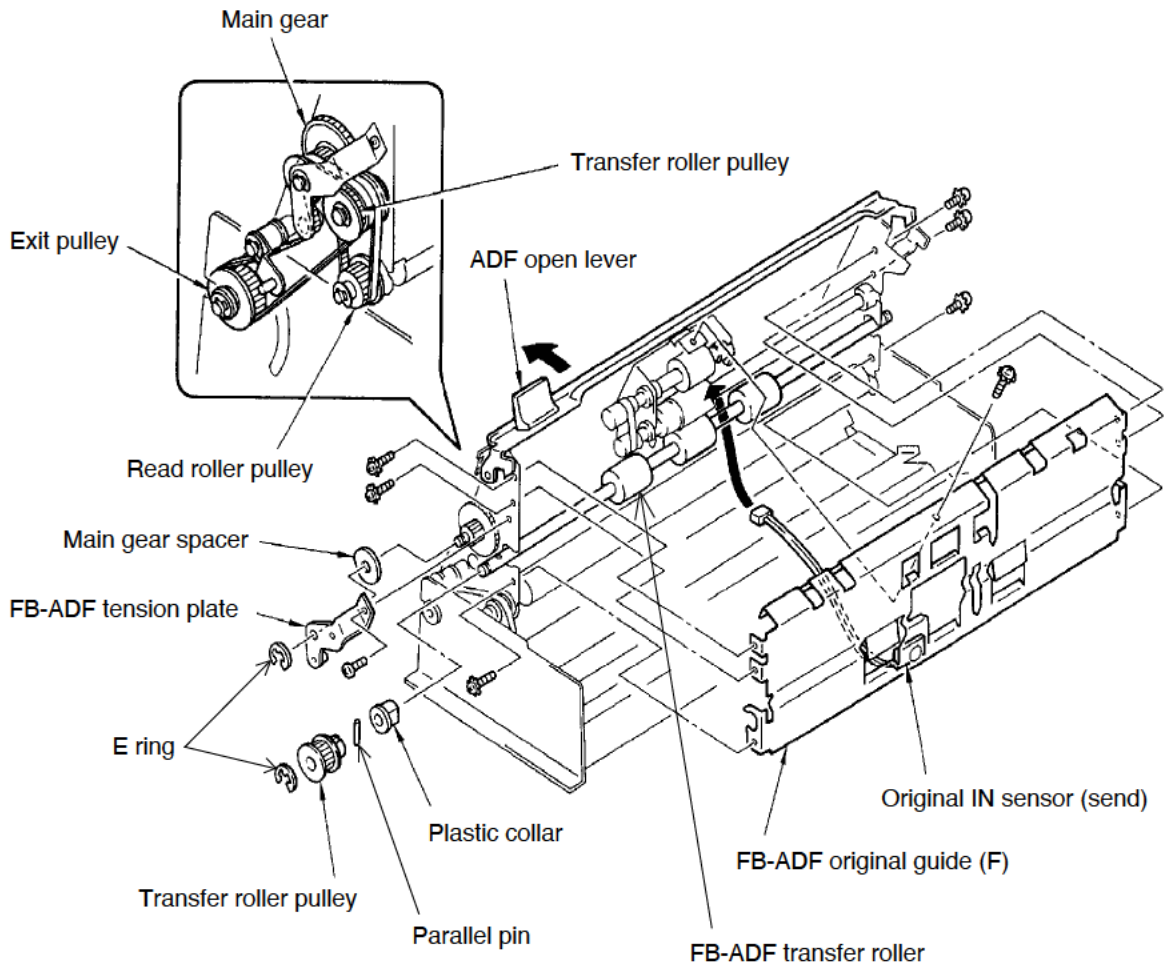
13. FB-ADF Transfer Roller

< Removal Procedure >

1. Remove the FB-ADF original guide (F), referring to the previous page.
2. Remove the mounting screw and an E ring on the FB-ADF tension plate, and remove the FB-ADF tension plate and disengage the belt.
3. Remove an E ring on the FB-ADF transfer roller and remove the Transfer roller pulley while disengaging the belt, and remove the Parallel pin and Plastic collar to free the FB-ADF transfer roller from the ADF unit.
   [IMPORTANT]
   Don't drop the parallel pin when removing the ADF gear because it will be freed.

- Precaution In Assembly -

- Apply good tension on the belt by adjusting the FB-ADF tension plate at its elongated hole.



14. FB-ADF Original Detection Sensor

< Removal Procedure >

1. Remove the FB-ADF original guide (F), referring to page VI-25.
2. Unplug the Connector from CN9 of the ADF PCB.
3. Remove the mounting screw on the Original detection sensor bracket and lift the ADF open lever.
4. Remove the Original detection sensor bracket with the sensor from the FB-ADF unit.
5. Separate the sensor from the bracket by pinching the hooks by fingers.

- Precautions In Assembly -

- Match the positioning hole on the Original detection sensor bracket with the positioning pin on the FB-ADF upper frame.

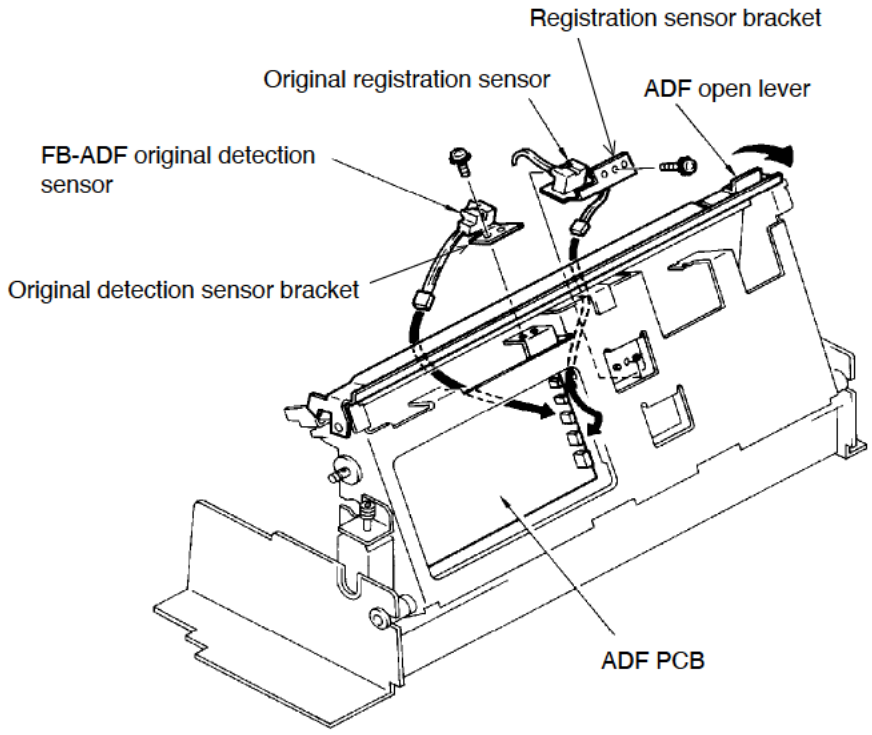
15. Original Registration Sensor

< Removal Procedure >

1. Remove the FB-ADF original guide (F), referring to page VI-25.
2. Unplug the Connector from CN10 of the ADF PCB.
3. Remove the mounting screw on the Original registration sensor bracket and remove the bracket with the sensor from the FB-ADF unit.
4. Separate the sensor from the bracket by pinching the hooks by fingers.

- Precautions In Assembly -

- The plastic actuator bar of the Original registration sensor should go under the FB-ADF transfer roller.
- Match the positioning holes on the Original registration sensor bracket with the positioning pins on the FB-ADF upper frame.



16. FB-ADF Pickup Roller (Upper)
17. ADF Stripper Roller
18. White Roller (Read Roller)

16. FB-ADF Pickup Roller (Upper)

< Removal Procedure >

1. Remove the FB-ADF original guide (F), referring to page VI-25.
2. Remove the FB-ADF original detection sensor referring to the previous page.
3. Remove an E ring on the right side end of the FB-ADF pickup roller (upper) and remove the pastic collar.
4. Slide and remove the FB-ADF pickup roller to the left while disengaging the belt from the Pulley A.
5. Remove an E ring from the other end of the FB-ADF pickup roller and remove the Pickup roller collar, Pulley A and Metal.

17. ADF Stripper Roller

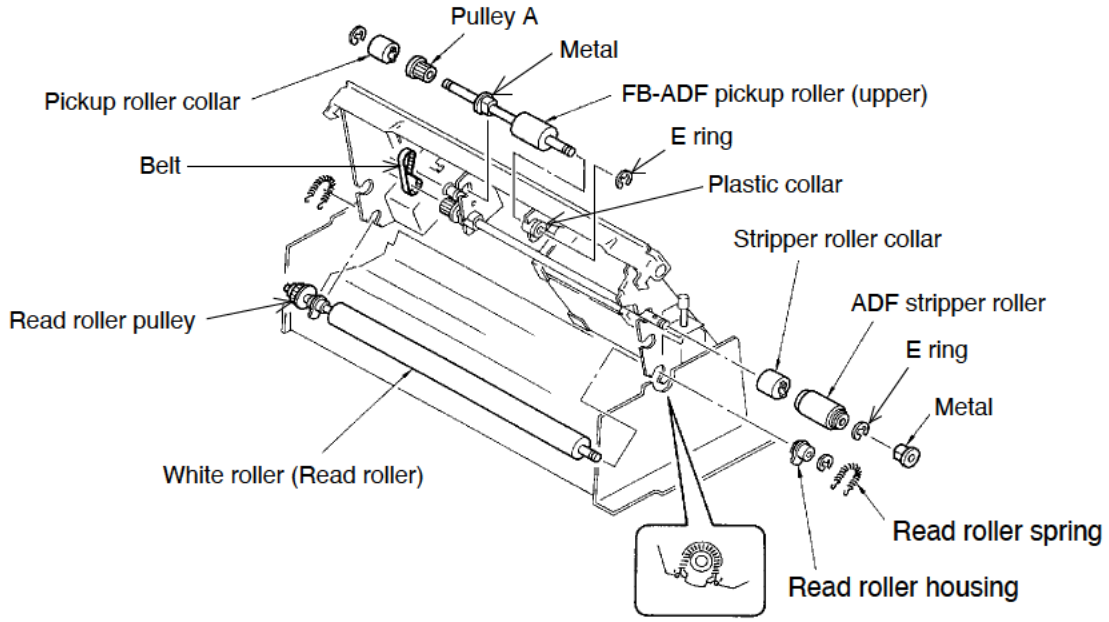
< Removal Procedure >

1. Remove the FB-ADF original guide (F), referring to page VI-25.
2. Remove an E ring next to the ADF stripper roller and remove the Metal at the end of the shaft.
3. Disengage the belt from the pulley on the other end of the shaft and slide the shaft to the left to separate it from the ADF unit.
4. Remove the ADF stripper roller and Stripper roller collar from the shaft.

18. White Roller (Read Roller)

< Removal Procedure >

1. Remove the FB-ADF original guide (F), referring to page VI-25.
2. Remove the two Read roller springs from both ends of the shaft.
3. Disengage the belt from the Read roller pulley.
4. Remove an E ring on the other end of the shaft and remove the Read roller housing.
5. Push the White roller to the left to disengage it from the ADF unit.
6. Remove an E ring next to the Read roller pulley and remove the Read roller pulley and Read roller housing from the White roller.



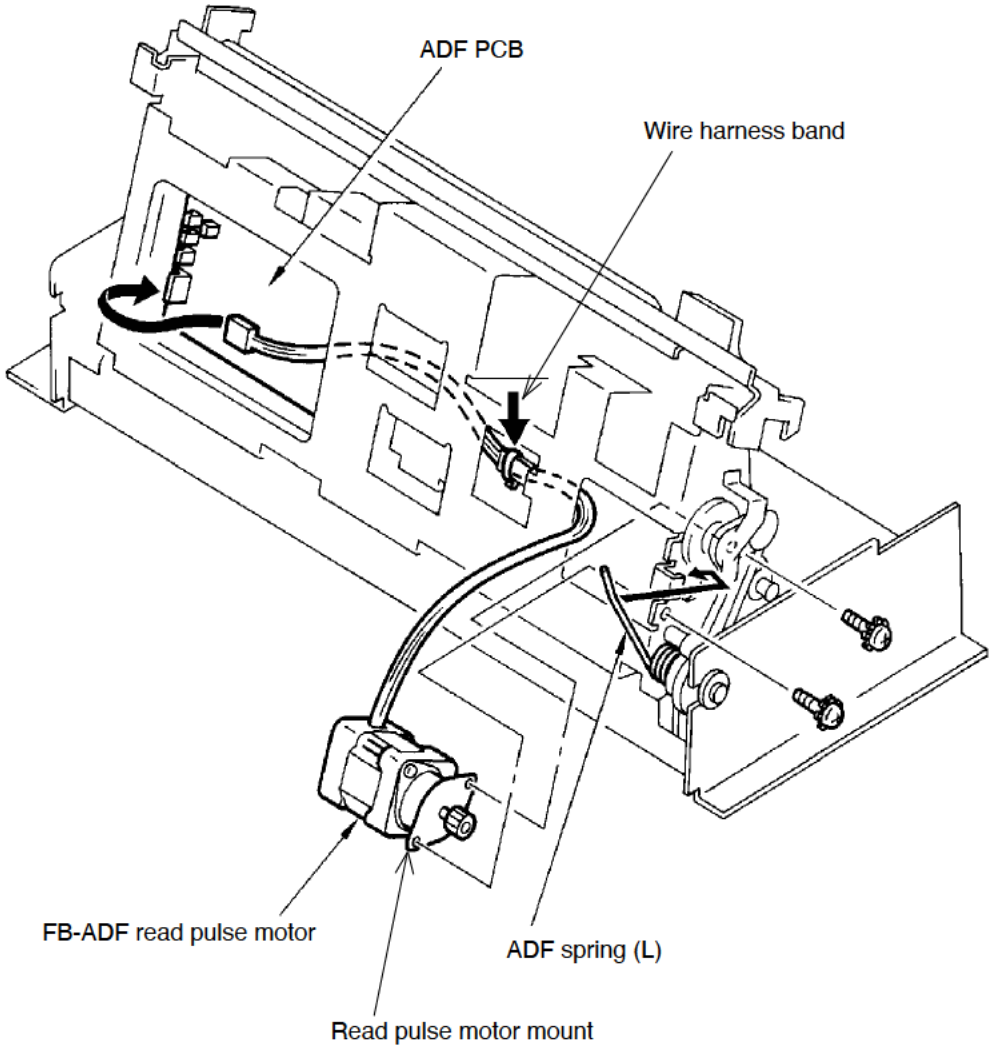
19. FB-ADF Read Pulse Motor

< Removal Procedure >

1. Turn OFF the power, and remove the ADF cover (B).
2. Unplug the connector of the FB-ADF read pulse motor from CN1 of the ADF PCB and cut the Wire harness band to free the motor cord from the ADF unit.
3. Unhook the ADF spring (L) from the FB-ADF upper frame.
4. Remove the two mounting screws on the FB-ADF read pulse motor mount, and remove the motor with the mount from the ADF unit.
5. Remove the Read pulse motor mount from the motor by removing two mounting screws.

- Precaution In Assembly -

- Fasten the motor cord back on the ADF unit with a new Wire harness band.



20. FB-ADF Motor
21. Original OUT Sensor

20. FB-ADF Motor

< Removal Procedure >

1. Turn OFF the power, and remove the FB-ADF cover (B).
2. Unhook the E ring and being careful not to misplace the parallel pin, remove the ADF gear.
3. Loosen the mounting screw of the FB-ADF motor cover.
4. Remove the two mounting screws of the Motor bracket and unplug the Connector from CN3 of the ADF PCB.
5. Remove the FB-ADF motor together with the bracket.
6. Remove the ADF motor bracket from the FB-ADF motor by removing two screws.

- Precaution in Assembly -

- Match the two positioning holes on the ADF motor bracket with the two positioning pins on the FB-ADF upper frame.

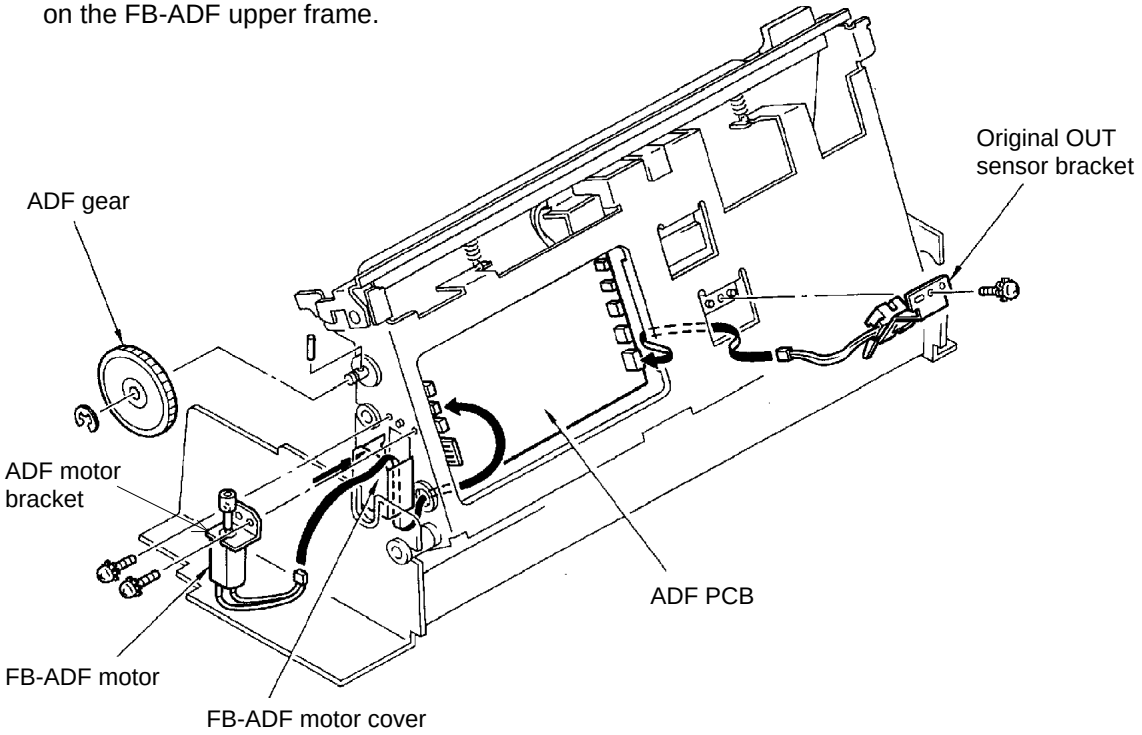
21. Original OUT Sensor

< Removal Procedure >

1. Turn OFF the power, and remove the FB-ADF cover (B).
2. Remove the mounting screw of the Original OUT sensor bracket.
3. Unplug the Connector of the Original OUT sensor from CN11 of the ADF PCB and remove the sensor from the FB-ADF unit, together with the bracket.
4. Remove the Original OUT sensor from the Original OUT sensor bracket by pinching the plastic hooks of the sensor with fingers.

- Precaution in Assembly -

- Match the two positioning holes on the Original OUT sensor bracket with the two positioning pins on the FB-ADF upper frame.



6.Flat Bed Image Scanning Section

[Adjustment]

1. Sensitivity of Original IN Sensor

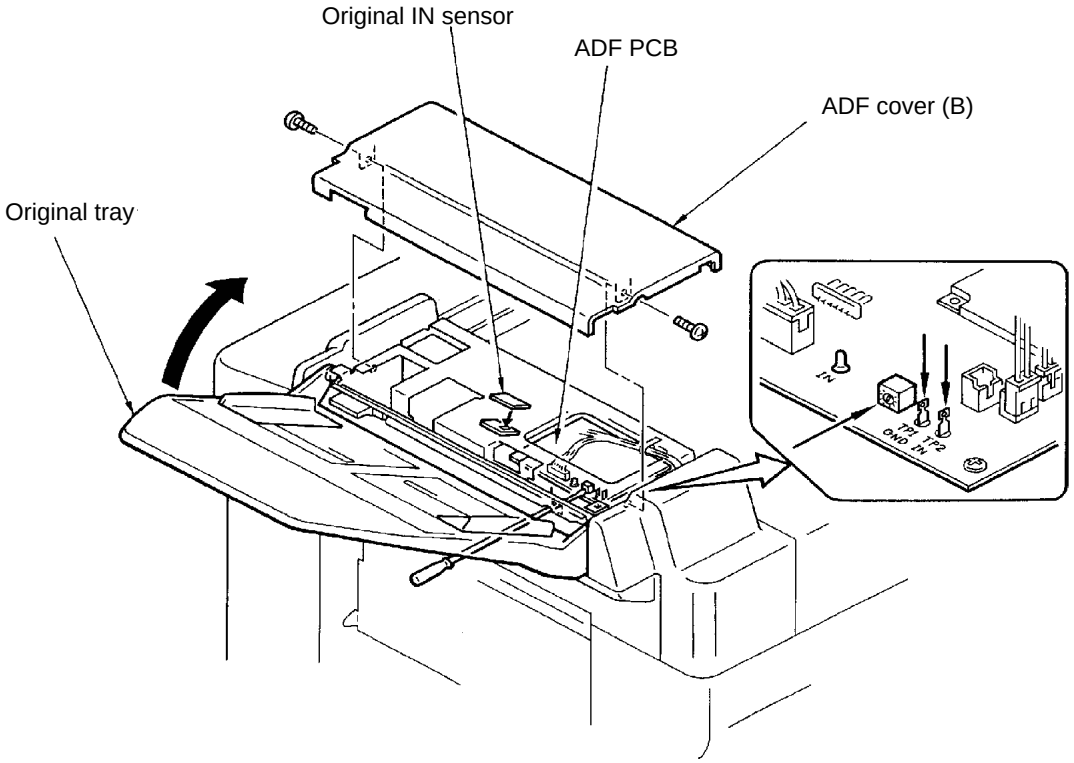
1. Turn OFF the power and remove the ADF Cover (B).
2. Connect a voltage meter between **TP1 (IN)** and **TP(2) (GND)** on the ADF PCB.
3. Turn ON the power and place a white sheet of paper in the light path of the Original IN sensor. The voltage should read **1.0±0.2** volts with a sheet of paper, and more than **3.0 volts** without (the light path of the Original IN Sensor not blocked).
4. If the above voltages are not obtained, adjust the sensitivity of the sensor by turning **VR1** on the ADF PCB.
   [Note]
   Turn the VR1 clockwise to increase the sensitivity of the sensor (the voltage increases).
   The counterclockwise rotation will decrease the sensitivity (the voltage decreases).

- Check -

- Check the LED "**IN**" on the ADF PCB.
  Confirm that it illuminates when the light path of the Original IN sensor is blocked (a sheet of paper is inserted), and goes out when the sensor's light path is open (a sheet of paper is not inserted).

- Result of Misadjustment -

- If the sensitivity of the sensor is too high;
  The Original IN sensor cannot detect the original fed to the Image scanner even if the original is actually fed, and it is determined that the original has jammed before the Image scanner.
  As a result, the original jam error code **[E 37]** will be displayed.
- If the sensitivity of the sensor is too low;
  It is determined that an original has already jammed before master making and the original jam error code **[E 37]** will be displayed.



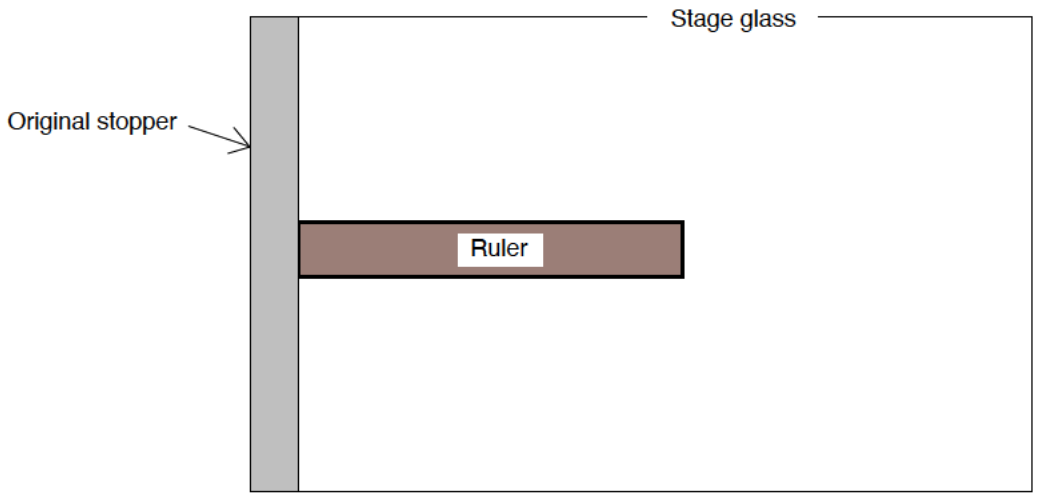
2. Scanning Start Position

(1) When Scanning on the Stage Glass (Without the Book procesing feature)

1. Place a ruler with scales engraved from the top edge on the Stage glass, against the Original stopper as shown on the sketch below, and close the Stage cover.
2. Select the PHOTO mode by LINE/PHOTO button and make a master and then print.
3. Check the print and confirm that the top **5±2mm** of the scale is erased on the print.
4. If more or less is erased, use Memory SW **No.87** (Test mode No.87) to make the correction.
5. Press the PRINT POSITION button to select a Memory switch setting referring to the chart on next page.
   For instance, if Memory switch setting number **4** needs to be selected, press the PRINT POSITION button to move the number up or down until the display shows **4 87**.
6. Press the **STOP** button and then the **ALL RESET** button to input the selected number.
   The panel display returns to an ordinary indication.

(2) When Scanning on the Stage Glass (With the Book procesing feature)

1. Erase top **2mm** of the ruler with a white correction fluid and place it on the Stage glass, against the Original stopper, and close the Stage cover.
   The **top 2mm must be erased white** to make "white margin" for this adjustment to work properly.
2. Select the PHOTO mode by LINE/PHOTO button and select BOUND BOOK CENTER mode (does not matter if it is Photo or Erase), and make a master and then print.
3. Check the print and confirm that the **5±2mm** of the ruler from its top is erased on the print.
4. If more or less is erased, use Memory SW **No.82** (Test mode No.82) to make the correction.
5. Press the PRINT POSITION button to select a Memory switch setting referring to the chart on next page.
   For instance, if Memory switch setting number **6** needs to be selected, press the PRINT POSITION button to move the number up or down until the display shows **6 82**.
6. Press the **STOP** button and then the **ALL RESET** button to input the selected number.
   The panel display returns to an ordinary indication.



(3) When using ADF Unit for the Scanning

1. Using an original with continuous image from the top (original without white margin on the top), make a master through the ADF Unit, and make a print.
2. Check the print and confirm that the top **5±2mm** of the measure is erased on the print.
3. If more or less is erased, use Memory SW **No.86** (Test mode No.86) to make the correction.
4. Press the PRINT POSITION button to select a Memory switch setting referring to the chart below.
   For instance, if Memory switch setting number **9** needs to be selected, press the PRINT POSITION button to move the number up or down until the display shows **9 86**.
5. Press the **STOP** button and then the **ALL RESET** button to input the selected number.
   The panel display returns to an ordinary indication.

- Precautions in Adjustment -

- The once-input Memory switch setting cannot be erased even if Test mode No.90 or 97 is activated or when System ROM is replaced.
- The Memory switch setting is erased when **System PCB** is replaced or when Test mode **No.98** is applied.
  In this case all other Memory switch settings will also be erased.

(1) BOUND BOOK CENTER not selected (No.87) ← REDUCE ——— INCREASE →

(2) BOUND BOOK CENTER selected (No.82) ← INCREASE ——— REDUCE →

(3) Scanning with ADF Unit (No.86) ← REDUCE ——— INCREASE →

Memory SW	9	A	B	C	D	E	F	0
Adjustment (mm)	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0

1	2	3	4	5	6	7	8
+0.2	+0.4	+0.6	+0.8	+1.0	+1.2	+1.4	+1.6

3. Image Elongation/Shrinkage Correction

- When Scanning on the Stage Glass (Flat bed read pulse motor speed adjustment).

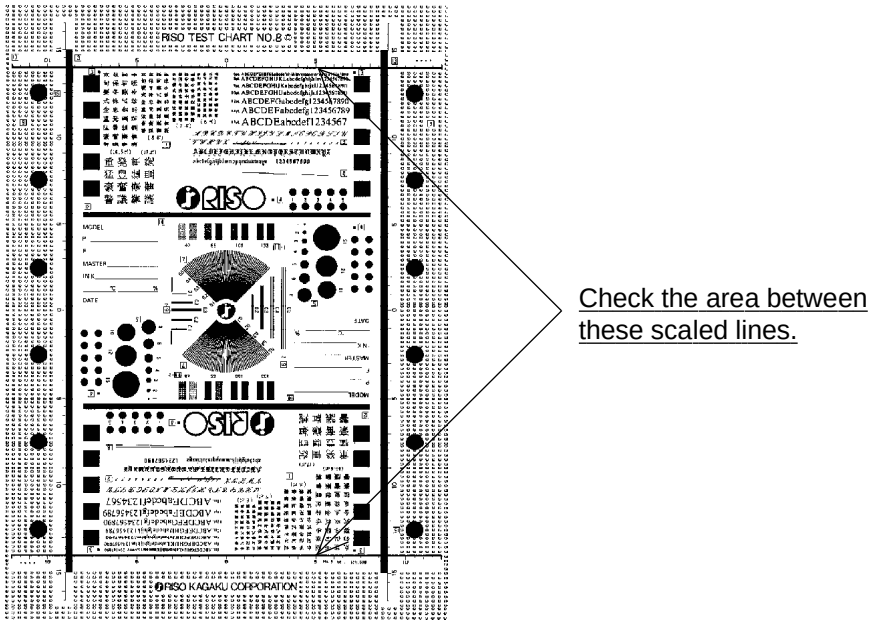
1. Make a master at **[1:1]** size using **Test chart No.8** and make prints.
2. Compare printouts with the test chart original.
   Check that the difference in image size is **within 4mm** in the area between the top and bottom scaled lines, between the printouts and the test chart original.
3. If it is elongated or shrunk **by 4mm or more**, compared to the original size, make corrections turning the Hex **(SW2)** on the **Image processing PCB**, referring to the chart on the next page.
   [IMPORTANT]
   Be sure to turn OFF the machine each time the Hex SW is turned to update the memory.

- When using ADF unit for Scanning (ADF Read pulse motor speed adjustment).

1. Make a master at **[1:1]** size using **Test chart No.8** through the ADF Unit and make prints.
2. Compare printouts with the test chart original.
   Check that the difference in image size is **within 4mm** in the area between the top and bottom scaled lines, between the printouts and the test chart original.
3. If it is elongated or shrunk **by 4mm or more**, compared to the original size, make corrections turning the **Hex (SW3)** on the **Image processing PCB**, referring to the chart on the next page.
   [IMPORTANT]
   Be sure to turn OFF the machine each time the Hex SW is turned to update the memory.

- Precautions in Adjustment -

- There may be more than one reason for elongation or shrinkage of printed image.
  Mechanical causes, i.e. backward tension on the master roll, wear of the White roller, loose screw in the pulleys, etc. should also be checked.



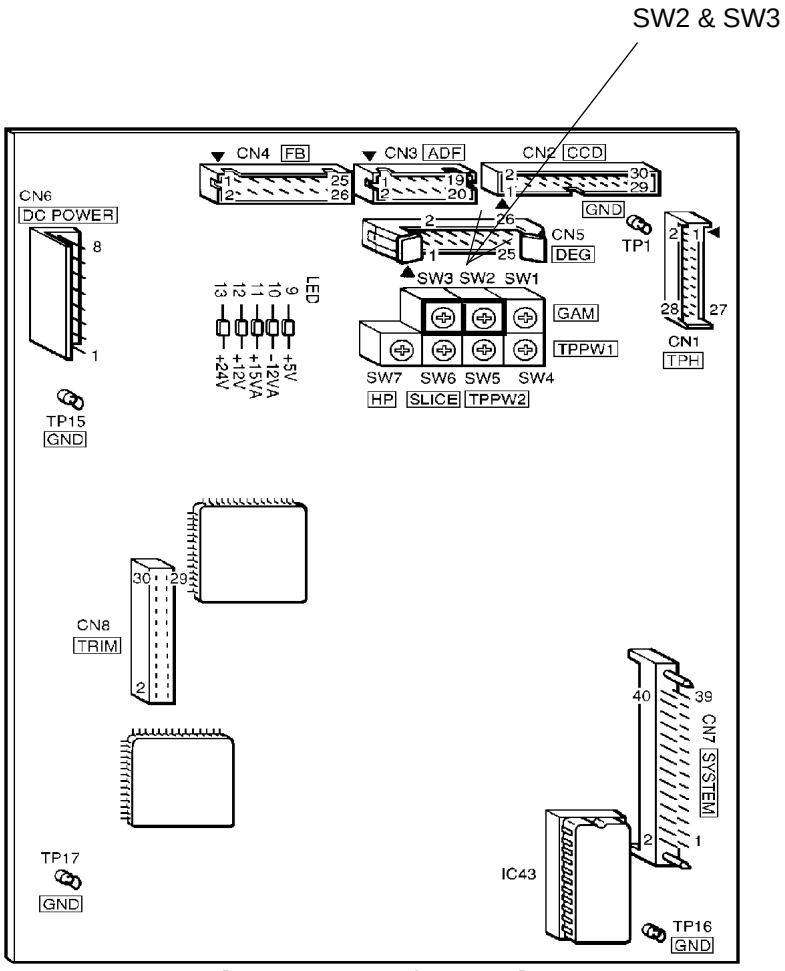
[Test Chart No.8]

Adjustable Range Chart for the Image Elongation/Shrinkage Correction

← Elongates ——— | ——— Shrinks →

SW Setting	5	6	7	8	9	A	B	C
Adjustable Range (mm)	+3	+2	+1	0	-1	-2	-3	-4

* The switch should be set at between **5~C** only.



[Image Processing PCB]

4. Horizontal Scanning Position

- When Scanning on the Stage Glass

1. Place **Test chart No.8** on the Stage Glass, against the Original stopper.
2. Make a master at **[1:1]** size and make prints.
3. Check if all "e" marks on both sides of the test chart original appear on the master on the Drum.
4. If not, adjust the horizontal scanning position by Memory SW **No.84** (Test mode No.84), referring to the chart below.
5. Press the PRINT POSITION button to select a desired Memory switch setting referring to the chart below.
   For instance, if Memory switch setting number **9** needs to be selected, press the PRINT POSITION button to move the number up or down until the display shows **9 84**.
6. Press the **STOP** button and then the **ALL RESET** button to input the selected number.
   The panel display returns to an ordinary indication.

- When using ADF Unit for Scanning

1. Make a master at **[1:1]** size using **Test chart No.8** through the ADF Unit.
2. Check if all "e" marks on both sides of the test chart original appear on the master on the Drum.
3. If not, adjust the horizontal scanning position by Memory SW **No.83** (Test mode No.83), referring to the chart below.
   (Refer to above for the operation of the Memory switch)

[IMPORTANT]

If "e" marks on both sides are missing in a large area, check the installation position of the **Paper size potentiometer** under the Paper feed tray, referring to the page I-17, and the **Master making width adjustmen**t, referring to the page VII-15.

- Precautions in Adjustment -

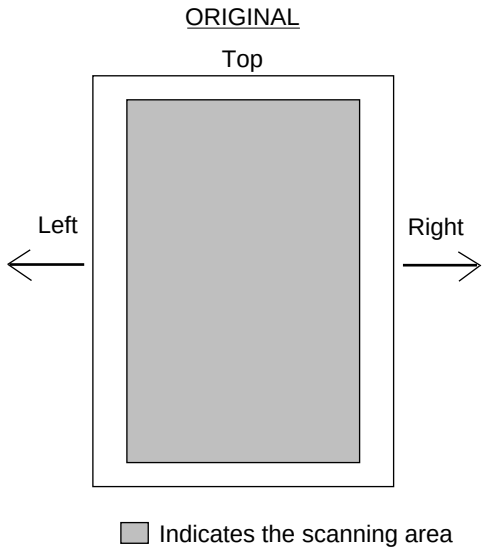
- The once-input Memory switch setting cannot be erased even if Test mode No.90 or 97 is activated or when System ROM is replaced.
- The Memory switch setting is erased when **System PCB** is replaced or when Test mode **No.98** is applied.
  In this case all other Memory switch settings which have been input will also be erased.

Memory SW No.83 & 84

Memory SW	Adjustment (mm)
9	-3.5
A	-3.0
B	-2.5
C	-2.0
D	-1.5
E	-1.0
F	-0.5
0	0
1	+0.5
2	+1.0
3	+1.5
4	+2.0
5	+2.5
6	+3.0
7	+3.5
8	+4.0

The scanning area slides to the left.

The scanning area slides to the right.



5. Image Scanner ADF Home Position

1. If the printed images are not sharp when the scanning is done through the ADF, compare it with the prints made when the scanning is done with the original on the Stage glass.
2. By above comparison, if only the prints made by using the ADF is not clear, use the Memory switch **No.81** to make the correction.
3. Start up Test mode **No.81** and use the PRINT POSITION button < or > on the operation panel to select a desired Memory switch setting number referring to the chart below.
   For instance, if Memory switch setting number **5** needs to be selected, press the PRINT POSITION button to move the number up or down until the display shows **5 81**.
4. **To input the selected Memory switch setting into the machine, press the STOP button and then the ALL RESET button.**
   The panel display returns to an ordinary indication.

[Note]

When the scanning position of the Image scanner is adjusted to just under the White roller of the ADF, the printed image should become sharp.

- Precautions in Adjustment -

- The once-input Memory switch setting cannot be erased even if Test mode No.90 or 97 is activated or when System ROM is replaced.
- The Memory switch setting is erased when **System PCB** is replaced or when Test mode **No.98** is applied.
  In this case all other Memory switch settings will also be erased.

Memory Switch	Adjustment (mm)
9	-1.4
A	-1.2
B	-1.0
C	-0.8
D	-0.6
E	-0.4
F	-0.2
0	0
1	+0.2
2	+0.4
3	+0.6
4	+0.8
5	+1.0
6	+1.2
7	+1.4
8	+1.6

The scanning position moves towards the Original OUT sensor.
(Image scanner moves to the left)

The scanning position moves towards the Original IN sensor.
(Image scanner moves to the right)

7. Master Making Section

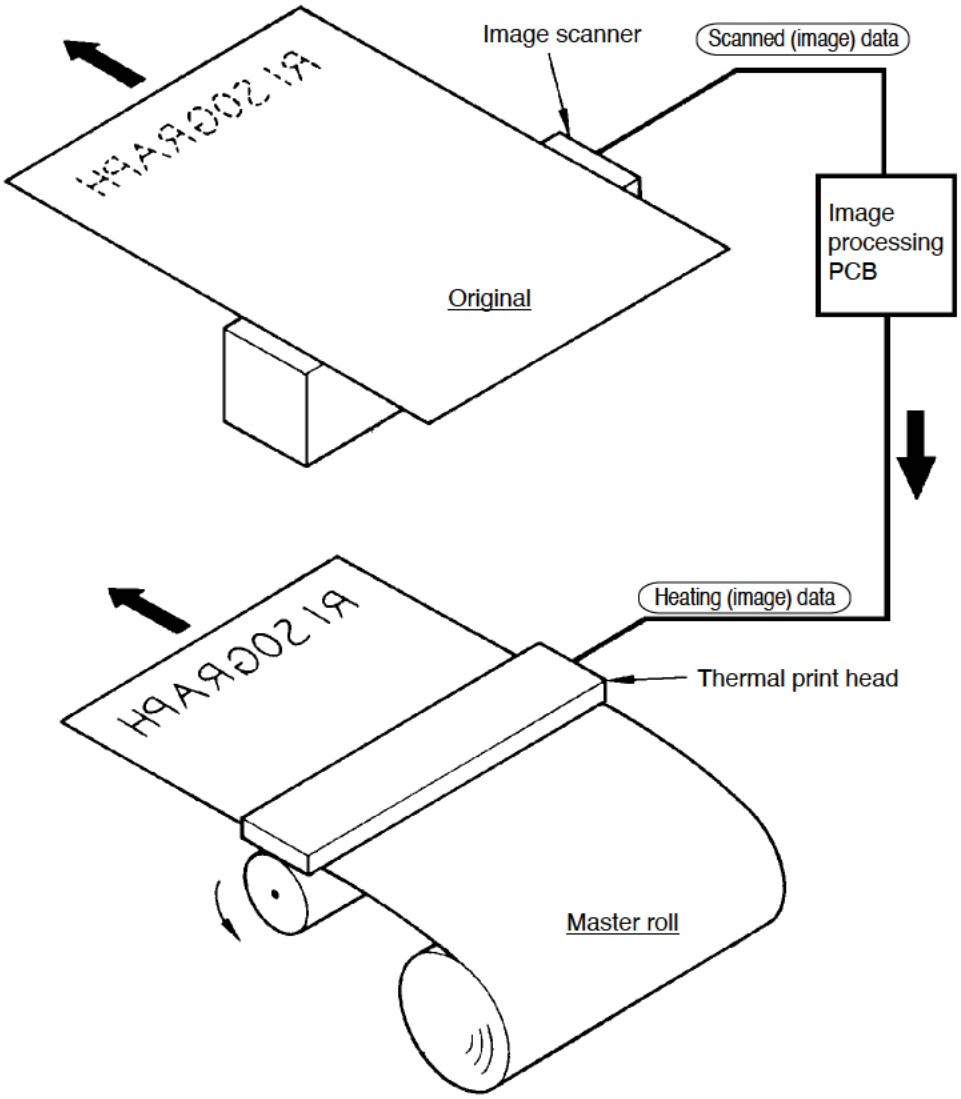
[Theory of Operation]

1. Heating Data Transmission System

- Function of Thermal Print Head
The Thermal print head heats up according to the signals sent from the Image processing PCB and creates image holes on master material.

- Control of Heating Data Transmission
When the Read and Write start signal is turned ON, heating (image) data start to be transmitted from the Image processing PCB to the Thermal print head for image perforation on a master. When the Read and Write start signal is turned OFF, the data transmission is stopped to finish the image perforation on a master.

- Heating Power Supply
When the START button is pressed to make a master, the TPH control signal is turned ON to supply heating power to the Thermal print head.



2. Thermal Print Head Positioning System

- Basic

The Thermal print head is lowered and raised by the rotation of the Thermal pressure motor.

- Lowering of Thermal Print Head

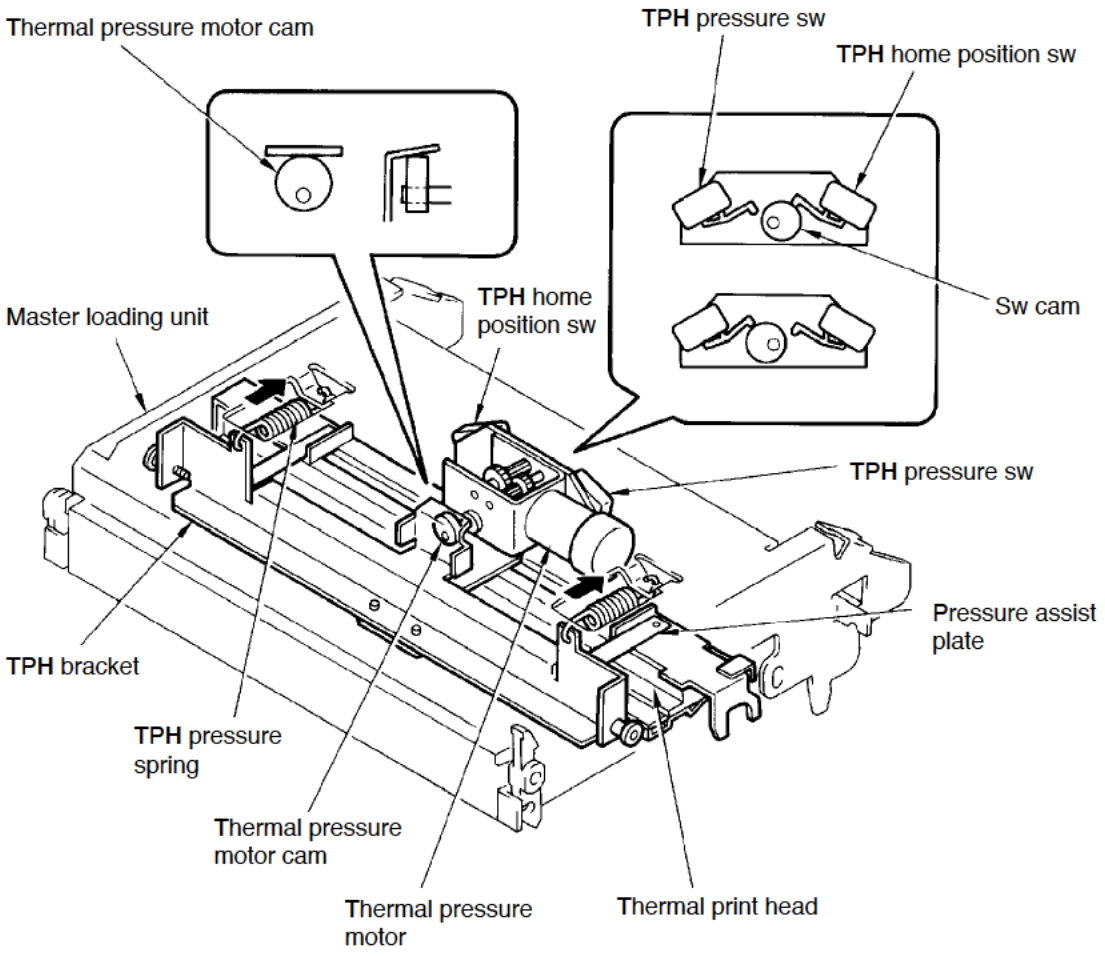
The Thermal pressure motor rotates until the TPH pressure switch has been actuated ON by the Sw cam, to lower the Thermal print head to the ready position.

- Pressing of Thermal Print Head on Write Roller

The lowered Thermal print head is pressed on the Write roller, with master material between, by the TPH pressure springs via the Pressure assist plates on both sides.
The Pressure assist plates are pushed down by the TPH bracket, which is pulled by the TPH pressure springs to make the Thermal print head pressed down.

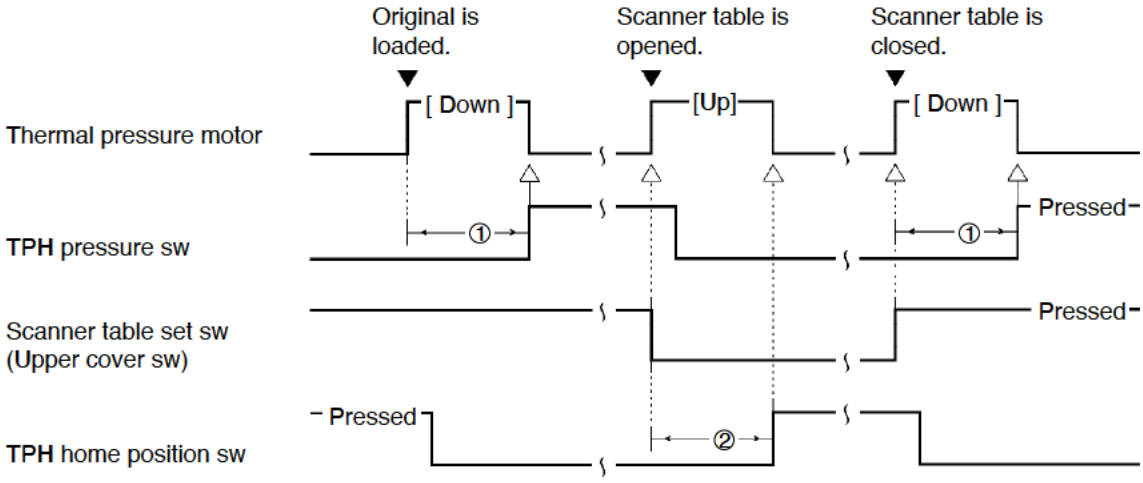
- Retreat of Thermal Print Head

The Thermal pressure motor rotates in reverse until the TPH home position switch has been actuated ON by the Sw cam, to raise the Thermal print head to the home (retreat) position by the Thermal pressure motor cam.
In this condition, the Thermal print head is separated from the Write roller.



- Timing Chart -

Thermal Print Head Positioning System



① If the TPH pressure sw has not been pressed ON **within 4 seconds** after the TPH pressure motor starts to rotate, the machine assumes that the TPH pressure motor has been locked and displays the error code **[E 19]**.

② If the TPH home position sw has not been pressed ON **within 4 seconds** after the TPH pressure motor starts to rotate, the machine assumes that the TPH pressure motor has been locked and displays the error code **[E 19]**.

3. Master Making System

- Start of Master Making

When the Start button is pressed with an original loaded, the TPH control signal is turned ON to supply heating power to the Thermal print head.
A certain period later, the Read and Write start signal is turned ON, which activates the Write pulse motor to rotate the Write roller and starts image data transmission from the Image processing PCB to the Thermal print head for image perforation on a master.

- Master Feeding

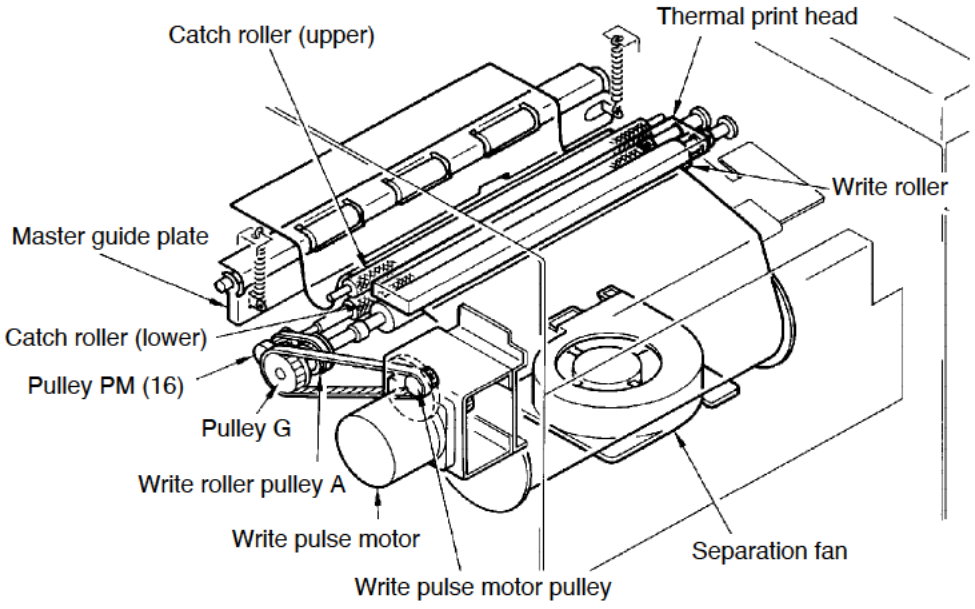
When the Write pulse motor starts rotating, master material is fed pulse by pulse by the clockwise rotation of the Write roller, which is rotated via the <Write pulse motor pulley-belt-Pulley G> route.
A new-made master is fed further by the Catch rollers (upper) an (lower), which are also rotated by the Write pulse motor via the <Pulley G-Write roller pulley A-belt-Pulley PM (16)> route.

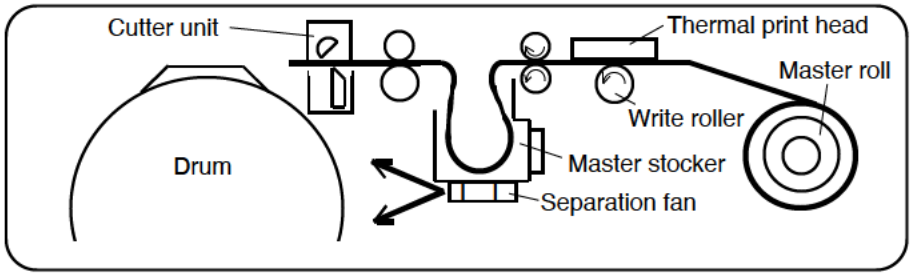
- Finish of Master Making

When a certain length of master has been made according to the size of an original or printing paper, the Read and Write start signal is turned OFF, which stops the rotation of the Write pulse motor and the image data transmission to finish image perforation on the master.
At the same time, the TPH control signal is turned OFF to terminate heating power supply to the Thermal print head, which is raised by the rotation of the Thermal pressure motor to release master material for master loading operation in the next step.

- Storage of a New-made Master

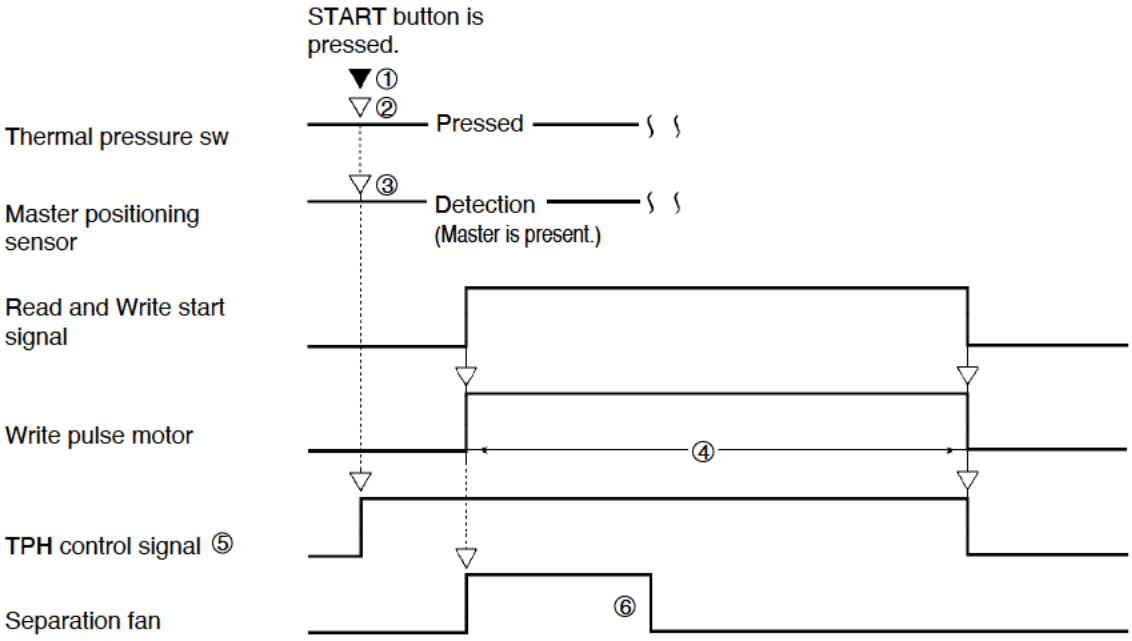
A new-made master is pulled into the Master stocker by air suction originating from the Separation fan operating at the beginning of master making (master removal) operation, and stored there to await loading on the Drum while an old master is removed from it.





- Timing Chart -

Master Making System



① The START button input is not accepted while an original is being loaded into the ADF unit.

② If the TPH pressure switch is not pressed ON, the master making operation starts after the Thermal pressure motor is rotated until the TPH pressure switch has been pressed ON.

③ If the Master positioning sensor detects no master (reflected light), the master making operation starts after a master is fed to the Master positioning sensor.

④ The Write pulse motor is deactivated at the same time the Read and Write start signal is turned OFF.
If the Write pulse motor has not been rotated by **4566 pulses** at this point yet, however, it is deactivated only after it has been rotated by **4566 pulses** because a new-made master can't be fed to the Drum without some master stored into the Master stocker.

⑤ When the TPH control signal is turned ON, power (voltage) is applied to the Thermal print head.

⑥ As for the time of deactivation of the Separation fan, refer to the timing chart of Master removal system on the page VIII-3.

7.Master Making Section

[Removal and Assembly]

1. Thermal Print Head

< Removal Procedure >

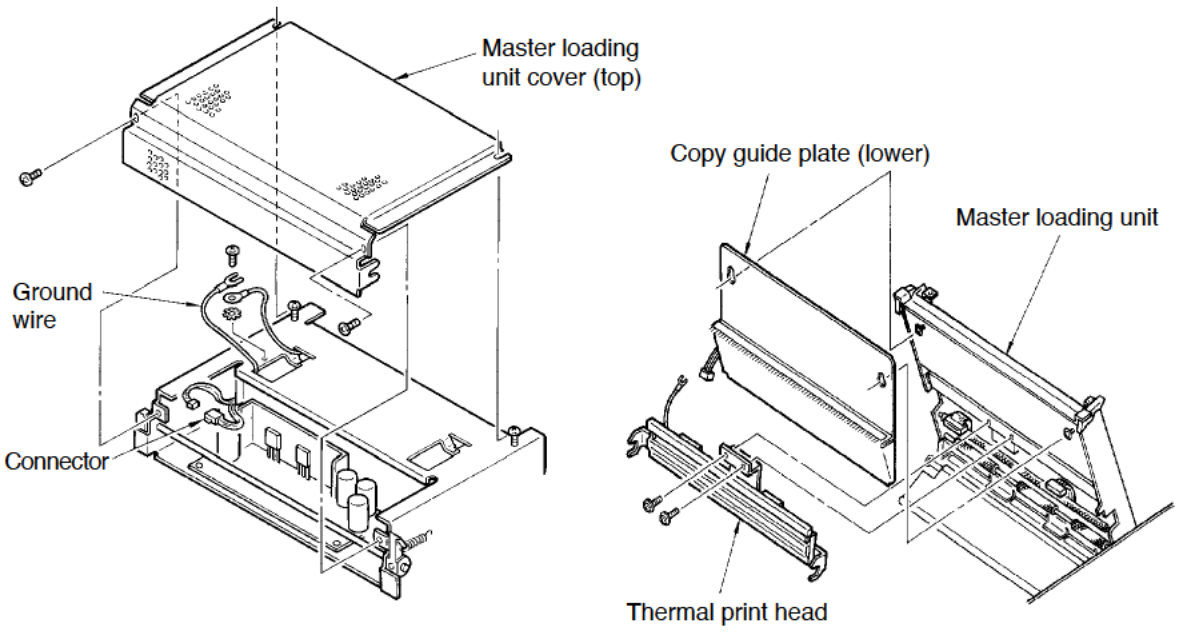
1. Turn ON the power and open the Upper cover (or the Scanner table).
   Then turn OFF the power.
   [Note]
   The above procedure is to raise the Thermal print head.
2. Loosen two mounting screws on the top of the Master loading unit cover (top) and remove other two mounting screws on the front of the cover. Then remove the cover.
3. Remove the ground wire by loosening the securing screw.
4. Disconnect the connector of the Master end sensor (receive).
5. Open the Master loading unit, and place a sheet of paper under the Thermal print head.
   [Note]
   This is to prevent screws from falling inside the machine when they are removed.
6. Loosen two mounting screws on the Copy guide plate (lower), and remove the plate.
   [IMPORTANT]
   Be careful not to damage the heating elements of the Thermal print head when removing the cover.
7. Remove two mounting screws on the bracket of the Thermal print head, disconnect two connectors from the Thermal print head and remove it from the Master loading unit.

- Precautions In Removal -

- Be careful not to damage the heating elements of the Thermal print head.
- Be careful not to touch the metal pins of the connectors.
  Static electricity from your body (finger) may damage the Thermal print head.

- Precautions In Assembly -

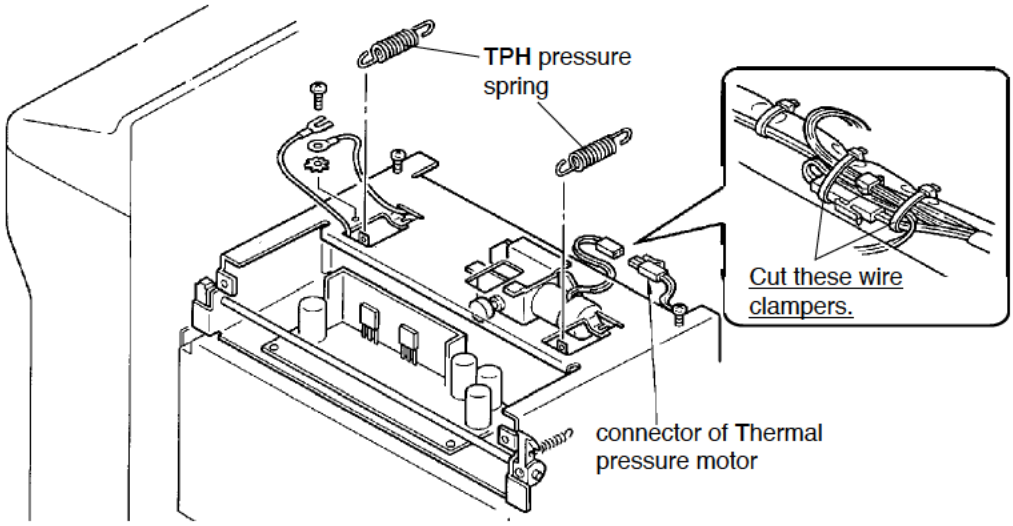
- Be sure to adjust the thermal power each time the Thermal print head is replaced, referring to the pages VII-13 to VII-16.



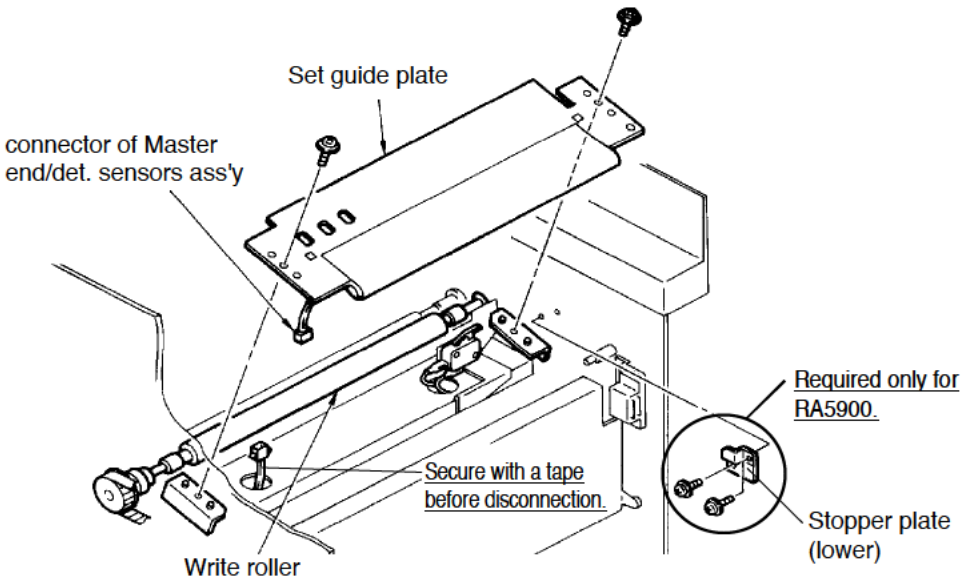
2. TPH Pressure SW & TPH Home Position SW

< Removal Procedure >

1. Remove the Thermal print head, referring to the page VII-7.
2. Close the Master loading unit and remove the TPH pressure springs on both sides of the unit.
3. Cut the wire clampers holding the wires of the Thermal pressure motor and disconnect the connector of the Thermal pressure motor.



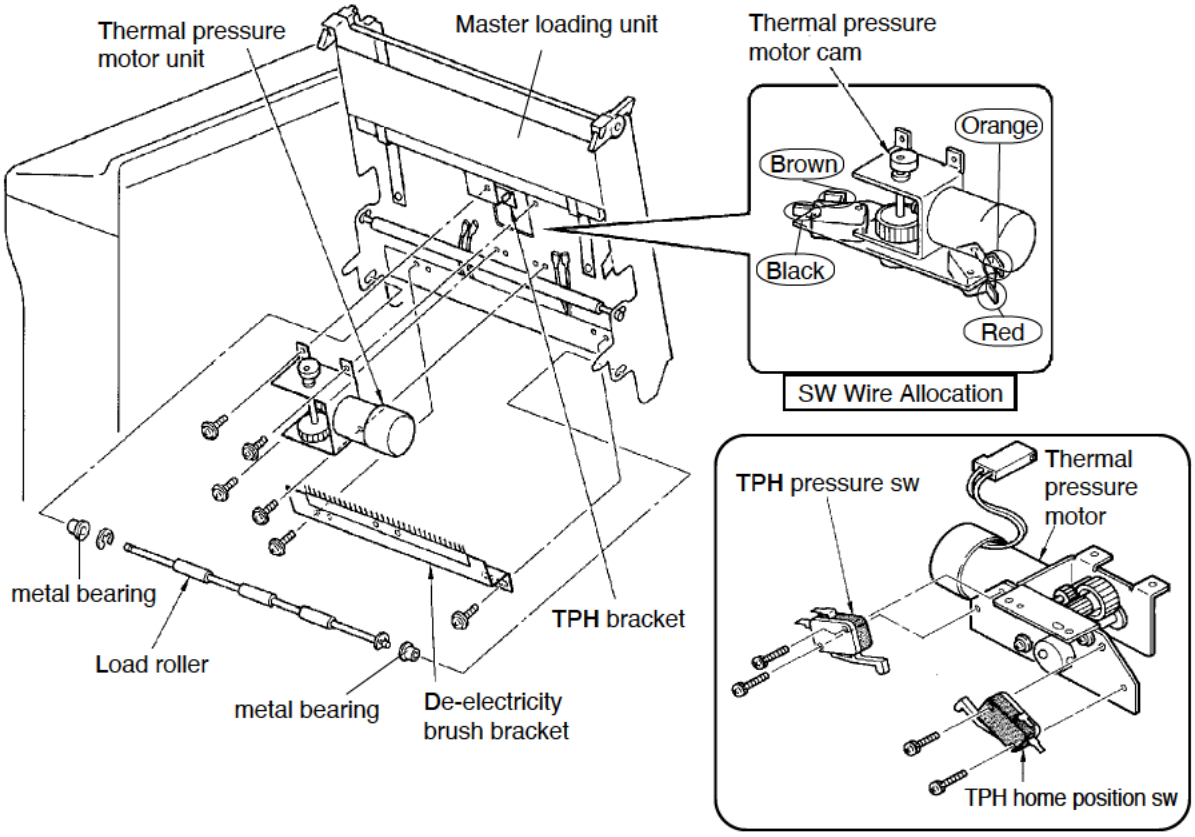
4. Open the Master loading unit.
5. Remove two mounting screws on the Set guide plate and set aside the plate.
   [Note]
   In RA5900, the Stopper plate (lower) should be removed to remove the mounting screw of the Set guide plate on the rear side of the machine.
6. Disconnect the connector of the Master end/det. sensors ass'y and take out the Set guide plate from the machine.
   [Note]
   Secure the wires of the counterpart connector with a tape before disconnection to prevent the counterpart connector from slipping into the inside.


Set guide plate
connector of Master end/det. sensors ass'y
Required only for RA5900.
Secure with a tape before disconnection.
Stopper plate (lower)
Write roller

7. Place a sheet of paper below the Master loading unit to prevent E rings and screws from dropping inside the machine when they are removed.
8. Remove an E ring securing a metal bearing at one end of the Load roller shaft and slide the metal bearing on the shaft off the Master loading unit frame.
   Remove the Load roller from the Master loading unit, shifting it sideways.
   [IMPORTANT]
   Don't drop the metal bearing at the other end of the Load roller shaft when removing the roller.
9. Remove two mounting screws on the De-electricity brush bracket, and remove the bracket.
10. Remove four mounting screws on the Thermal pressure motor unit, and remove the unit from the Master loading unit frame.
11. Holding the Thermal pressure motor unit, disconnect wires from the terminals of the TPH pressure sw and TPH home position sw.
12. Remove two mounting screws respectively on the TPH pressure sw and TPH home position sw and separate them from the Thermal pressure motor unit.

- Precautions In Assembly -

- Confirm the installation direction of the switches before attaching them to the unit.
- Make sure to connect wires to the correct terminals of the TPH pressure sw and TPH home position sw, referring to the figure below.
- Make sure to put grease on the Thermal pressure motor cam and the part of the TPH bracket with which the Thermal pressure motor cam is in contact.
- Make sure to match the respective positioning holes of the De-electricity brush bracket and Set guide plate with the corresponding bosses on the machine frame when securing them.
- Secure the connectors and wires of the TPH pressure sw, TPH home position sw and Thermal pressure motor with wire clampers in the same way as before removal.



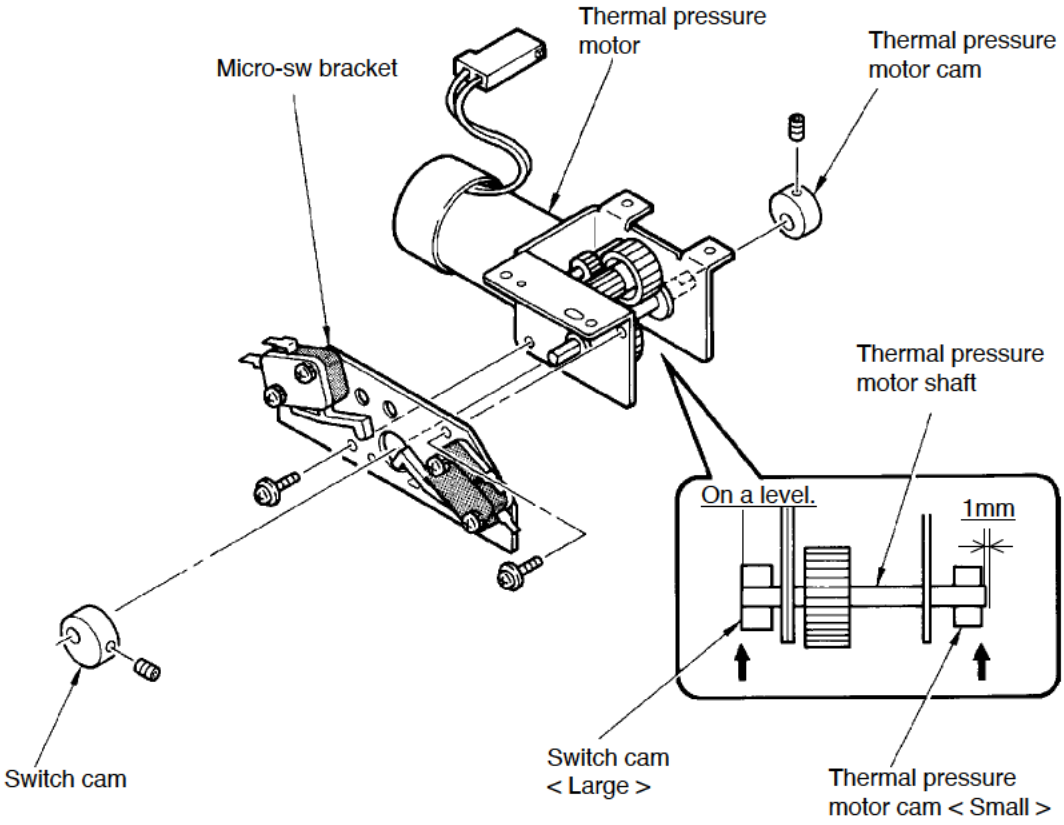
3. Thermal Pressure Motor Ass'y

< Removal Procedure >

1. Remove the Thermal pressure motor unit, referring to the pages VII-8 & VII-9.
2. Loosen the respective allen screws securing the Switch cam and Thermal pressure motor cam on the Thermal pressure motor shaft and remove these cams.
3. Remove two mounting screws on the Micro-sw bracket and separate the bracket from the Thermal pressure motor ass'y.

- Precautions In Assembly -

- Make sure to match the positioning holes of the Micro-sw bracket with the bosses on the Thermal pressure motor ass'y when attaching it.
- Remember that the Switch cam is larger than the Thermal pressure motor cam.
  Make sure to secure the Switch cam with its side face on a level with the end of the shaft, and the Thermal pressure motor cam with the end of the shaft protruding by 1mm from the cam's side face, as shown in the figure below.
- Make sure to tighten the allen screw on the flat cut face of the shaft when securing the cams.
- Make sure to put grease on the Thermal pressure motor cam.



4. Write Roller

< Removal Procedure >

1. Turn ON the power and open the Upper cover (or the Scanner Table) and Master loading unit. Then turn OFF the power.
   [Note]
   The above procedure is to raise the Thermal print head.
2. Remove the Front right cover.
3. Remove three mounting screws on the Power supply cover plate located on the left of the Power supply unit, and let the plate hang free.
4. Loosen two mounting screws on the Write pulse motor, and remove the belt on the Pulley G by sliding the motor.
5. Loosen the allen screw securing the Pulley G on the shaft and slide the pulley off the shaft.
6. Remove the belt on the Write roller pulley A and loosen the allen screw securing the Write roller pulley A on the shaft. Then slide the pulley off the shaft.
7. Remove the securing screw on the Bearing fixing plate and remove the plate and bearing.
8. Pull the Write roller toward the operation panel side to slide out the other end from the rear side machine frame and take it out from below the Master loading unit.
   [IMPORTANT]
   There is a bearing put on the other end of the Write roller. Do not drop it into the machine.

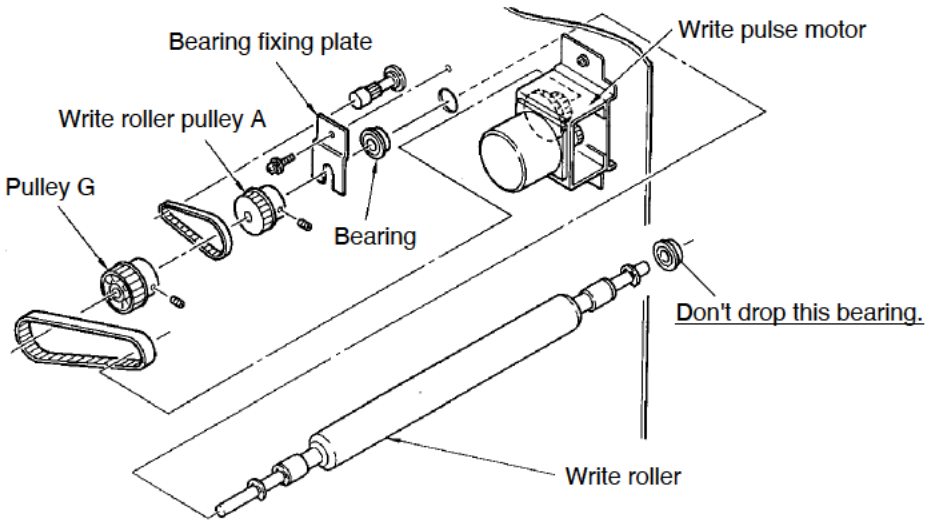
- Precautions In Assembly -

- Do not mount the Bearing fixing plate in reverse. The face with the part number imprinted should face you. Besides, make sure to match a small boss on the plate into a hole on the machine frame when securing it.
- Secure the Pulley G and Write roller pulley A on the Write roller shaft, following the steps below.
  1. Mount the Pulley G so that its outer face can be level with the end of the Write roller shaft.
  2. Pull the Write roller pulley A against the Pulley G and secure the Write roller pulley A.

  The allen screws should be tightened on the flat-cut face of the Write roller shaft.
- Confirm that the tension of the belt on the Write pulse motor is not too loose nor too tight after assembly.

- Phenomenon with a worn Write roller -

- If the Write roller is worn;
  images on prints may appear blurred on the edges or at about 60mm invervals ("60mm" is equal to the circumference of the Write roller), or wrinkles will be made during master making.



7.Master Making Section

[Adjustment]

1. Thermal Power of Thermal Print Head (4200) K-TPH Ass'y < 011-95037 >

1. Turn OFF the power.
2. Remove the Back cover.
3. Adjust the setting of **SW1 (TPH)** on the **Image processIn PCB** referring to the chart to the right according to the Resistance value (Ω) marked on the Thermal print head.
4. Next, check the voltage value for thermal power.
5. Open the Upper cover.
6. Remove the Master loading unit cover (top) by loosening two screws on the top and removing two screws in front.
7. Connect a voltmeter between pins **TP1 (+)** and **TP2 (GND)**on the **TPH Power PCB**, and disconnect the Jumper wire connector **TP3** on the PCB.
8. Close the Upper cover.
9. Turn ON the power and read the voltage on the voltmeter. Confirm that the voltage reading is **23.0 volts**.
10. If the voltage is not 23.0 volts, adjust **VR1 (+20VADJ)** or **VR2 (+20VADJ)** on the **TPH Power PCB** until 23.0 volts is obtained. (VR1 and VR2 can be reached through the opening under the Upper cover).
    VR1 = Fine adjustment VR2 = Rough adjustment
11. Turn OFF the power, and plug the Jumper wire connector **TP3** back on the PCB.

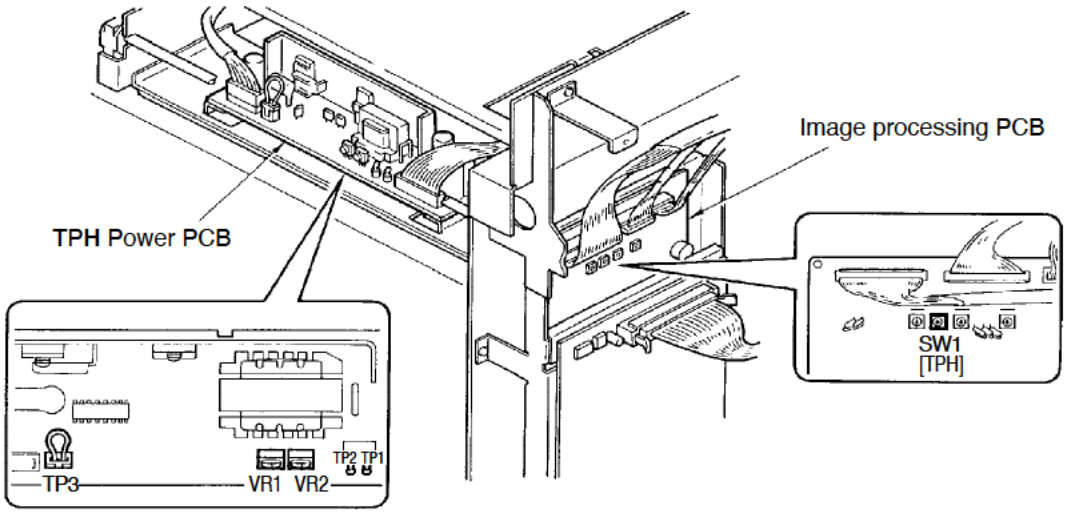
Resistance (Ω)	SW (TPH)
1700 ~ 1725	6
1726 ~ 1750	7
1751 ~ 1775	8
1776 ~ 1800	6
1801 ~ 1825	7
1826 ~ 1850	8
1851 ~ 1875	6
1876 ~ 1900	7
1901 ~ 1925	8
1926 ~ 1950	6
1951 ~ 1975	7
1976 ~ 2000	8
2001 ~ 2025	6
2026 ~ 2050	7
2051 ~ 2075	8
2076 ~ 2100	6
2101 ~ 2125	7
2126 ~ 2150	8
2151 ~ 2175	6
2176 ~ 2200	7
2201 ~ 2225	8
2226 ~ 2250	6
2251 ~ 2275	7
2276 ~ 2300	8

- Precautions In Adjustment -

- This adjustment has to be made every time the Thermal print head is replaced.
- The Upper cover should be closed to apply power to the Thermal print head. Otherwise, the Interlock sw will interrupt the power.

- Results of misadjustment -

- If the voltage is too high; solid print image will be deformed and the heating elements of the Thermal print head will be liable to damages due to overheat.
- If the voltage is too low; thin horizontal lines cannot be reproduced clearly.



2. Thermal Power of Thermal Print Head (4900)

T-TPH Ass'y (400) < 017-95035 >

1. Turn off the power.
2. Remove the Back cover.
3. Adjust the setting of **SW4** and **SW5** on the **Image processing PCB S**, refering to the chart to the right according to the Resistance value (Ω) marked on the Thermal print head.
4. Next, check the voltage value for thermal power.
5. Open the Upper cover.
6. Remove the Master loading unit cover (top) by loosening two screws on the top and removing two screws in front.
7. Connect a voltmeter between pins **TP1 (+)** and **TP2 (GND)** on the **TPH Power PCB**, and disconnect the Jumper wire connector **TP3** on the PCB.
8. Close the Upper cover.
9. Turn ON the power and read the voltage on the voltmeter.
   Confirm that the voltage reading conforms to the chart to the right.
10. If not, adjust **VR1 (+20VADJ)** or **VR2 (+20VADJ)** on the **TPH Power PCB**.
    (VR1 and VR2 can be reached through the opening under the Upper cover).
    VR1 = Fine adjustment VR2 = Rough adjustment
11. Turn OFF the power, and plug the Jumper wire connector **TP3** back on the PCB.

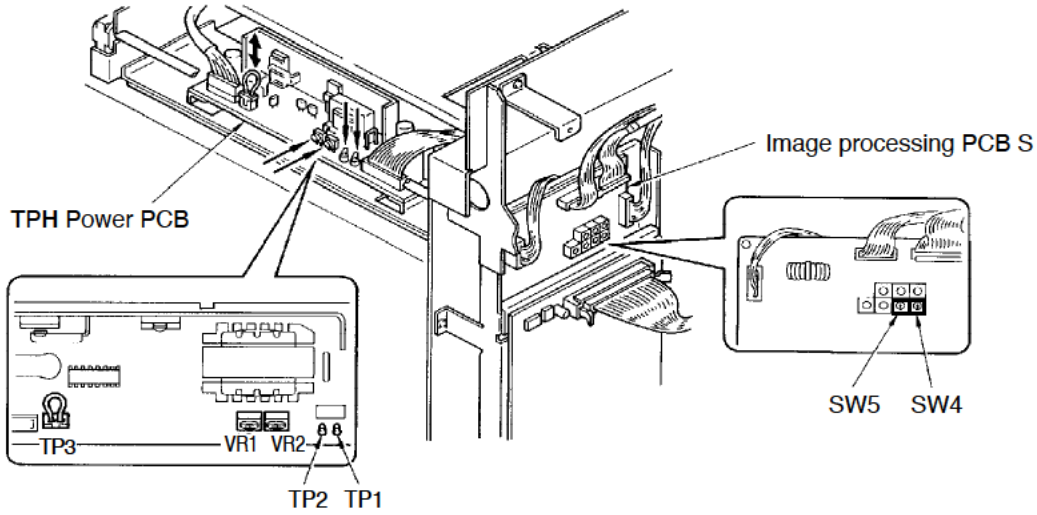
Voltage (V)	Resistance (Ω)	SW4 / SW5
19.0	2295 ~ 2382	F / E
19.5	2383 ~ 2421	E / D
	2422 ~ 2510	F / E
20.0	2511 ~ 2547	E / D
	2548 ~ 2640	F / E
20.5	2641 ~ 2676	E / D
	2677 ~ 2773	F / E
21.0	2774 ~ 2808	E / D
	2809 ~ 2910	F / E
21.5	2911 ~ 2944	E / D
	2945 ~ 3050	F / E
22.0	3051 ~ 3082	E / D
	3083 ~ 3194	F / E
22.5	3195 ~ 3224	E / D
	3225 ~ 3341	F / E
23.0	3342 ~ 3369	E / D
	3370 ~ 3450	F / E

- Precautions In Adjustment -

- This adjustment has to be made every time the Thermal print head is replaced.
- The Upper cover should be closed to apply power to the Thermal print head. Otherwise, the Interlock sw will interrupt the power.

- Results of misadjustment -

- If the voltage is too high; solid print image will be deformed and the heating elements of the Thermal print head will be liable to damages due to overheat.
- If the voltage is too low; thin horizontal lines cannot be reproduced clearly.



3. Thermal Power of Thermal Print Head (4300)

T-TPH Ass'y (300) < 017-95036 >

1. Turn off the power.
2. Remove the Back cover.
3. Adjust the setting of **SW4** and **SW5** on the **Image processing PCB F**, refering to the chart to the right according to the Resistance value (Ω) marked on the Thermal print head.
4. Next, check the voltage value for thermal power.
5. Open the Scanner table.
6. Remove the Master loading unit cover (top) by loosening two screws on the top and removing two screws in front.
7. Connect a voltmeter between pins **TP1 (+)** and **TP2 (GND)** on the **TPH Power PCB**, and disconnect the Jumper wire connector **TP3** on the PCB.
8. Close the Scanner table.
9. Turn ON the power and read the voltage on the voltmeter.
   Confirm that the voltage reading conforms to the chart to the right.
10. If not, adjust **VR1 (+20VADJ)** or **VR2 (+20VADJ)** on the **TPH Power PCB**.
    (VR1 and VR2 can be reached through the opening under the Upper cover).
    VR1 = Fine adjustment VR2 = Rough adjustment
11. Turn OFF the power, and plug the Jumper wire connector **TP3** back on the PCB.

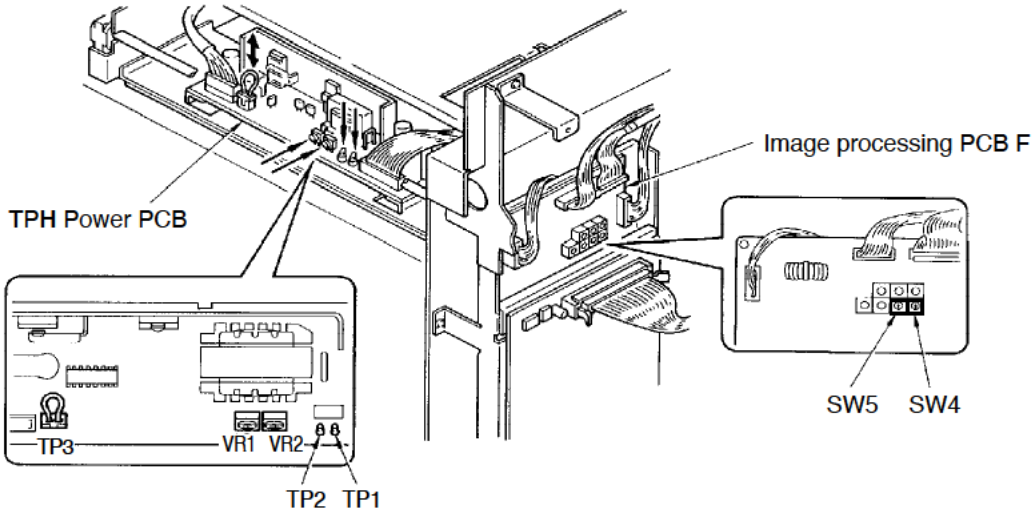
Voltage (V)	Resistance (Ω)	SW4 / SW5
19.0	1570 ~ 1620	E / D
	1621 ~ 1659	F / E
19.5	1660 ~ 1711	E / D
	1712 ~ 1739	F / E
20.0	1740 ~ 1800	E / D
	1801 ~ 1829	F / E
20.5	1830 ~ 1891	E / D
	1892 ~ 1919	F / E
21.0	1920 ~ 1984	E / D
	1985 ~ 2009	F / E
21.5	2010 ~ 2080	E / D
	2081 ~ 2109	F / E
22.0	2110 ~ 2130	E / D

- Precautions In Adjustment -

- This adjustment has to be made every time the Thermal print head is replaced.
- The Scanner table should be closed to apply power to the Thermal print head. Otherwise, the Interlock sw will interrupt the power.

- Results of misadjustment -

- If the voltage is too high; solid print image will be deformed and the heating elements of the Thermal print head will be liable to damages due to overheat.
- If the voltage is too low; thin horizontal lines cannot be reproduced clearly.



4. Thermal Power of Thermal Print Head (5900)

K-TPH Ass'y (400) < 017-95037 >

1. Turn off the power.
2. Remove the Back cover.
3. Adjust the setting of **SW4** and **SW5** on the **Image processing PCB F**, refering to the chart to the right according to the Resistance value (Ω) marked on the Thermal print head.
4. Next, check the voltage value for thermal power.
5. Open the Scanner table.
6. Remove the Master loading unit cover (top) by loosening two screws on the top and removing two screws in front.
7. Connect a voltmeter between pins **TP1 (+)** and **TP2 (GND)** on the **TPH Power PCB**, and disconnect the Jumper wire connector **TP3** on the PCB.
8. Close the Scanner table.
9. Turn ON the power and read the voltage on the voltmeter.
   Confirm that the voltage reading conforms to the chart to the right.
10. If not, adjust **VR1 (+20VADJ)** or **VR2 (+20VADJ)** on the **TPH Power PCB**.
    (VR1 and VR2 can be reached through the opening under the Upper cover).
    VR1 = Fine adjustment VR2 = Rough adjustment
11. Turn OFF the power, and plug the Jumper wire connector **TP3** back on the PCB.

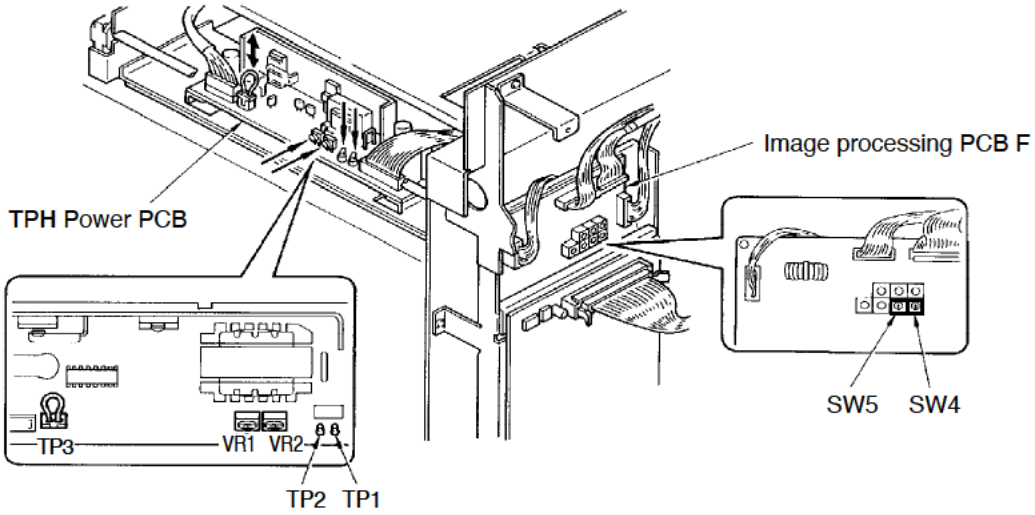
Voltage (V)	Resistance (Ω)	SW4 / SW5
20.0	2040 ~ 2118	D / C
	2119 ~ 2130	E / D
20.5	2131 ~ 2149	C / B
	2150 ~ 2227	D / C
21.0	2228 ~ 2256	C / B
	2257 ~ 2339	D / C
21.5	2340 ~ 2366	C / B
	2367 ~ 2453	D / C
22.0	2454 ~ 2479	C / B
	2480 ~ 2570	D / C
22.5	2571 ~ 2595	C / B
	2596 ~ 2690	D / C
23.0	2691 ~ 2713	C / B
	2714 ~ 2760	D / C

- Precautions In Adjustment -

- This adjustment has to be made every time the Thermal print head is replaced.
- The Scanner table should be closed to apply power to the Thermal print head. Otherwise, the Interlock sw will interrupt the power.

- Results of misadjustment -

- If the voltage is too high; solid print image will be deformed and the heating elements of the Thermal print head will be liable to damages due to overheat.
- If the voltage is too low; thin horizontal lines cannot be reproduced clearly.



5. Master Making Length (Write Pulse Motor Operation Time)

1. Make a master using A3 (or Ledger) size original without the top margin and make prints with A3 (or Ledger) size paper.
   Note: The original should have vertical lines drawn from edge to edge.
2. Measure the length of the line on printed copies, and confirm that it is **357mm** (with B4 drum), **290mm** (with A4 drum) or **348.5mm** (with Legal drum).
3. If the length is more or less than the above value, use Memory SW **No. 85** (Test mode No.85) to make correction.
4. When Memory SW **No. 85** is selected, the panel display shows **0 85**.
   The first digit "**0**" indicates a Memory sw setting.
5. Use the PRINT POSITION button < or > on the operation panel to select a desired Memory SW setting number, referring to the chart below.
   For instance, if Memory SW setting number **9** needs to be selected, press the PRINT POSITION button until the display shows **9 85**.
6. **To input the selected Memory SW setting into the machine, press the STOP button and then the ALL RESET button.**
   The panel display returns to an ordinary indication.

- Precautions in Adjustment -

- The once-input Memory SW setting can not be erased even if Test mode **No.90** or **97** is activated or when the System ROM is replaced.
- The Memory SW setting is erased when the **System PCB** is replaced or when Test mode **No.98** is applied. In this case, all other Memory SW settings will also be erased.

Setting No.	0	1	2	3	4	5	6	7
Pulses	0	+8	+16	+24	+31	+39	+47	+55
Adjustable Range (mm)	±0.0	+0.5	+1.0	+1.5	+2.0	+2.5	+3.0	+3.5
	8	9	A	B	C	D	E	F
	+63	-55	-47	-39	-31	-24	-16	-8
	+4.0	-3.5	-3.0	-2.5	-2.0	-1.5	-1.0	-0.5

6. Master Making Width

1. Place a sheet of paper with width of 210mm (A4 size paper) or 257mm (B4 size) on the Paper feed tray, and slide the Side guides against the paper.

2. Select Test mode **No. 91** and activate it.

   1 91 will appear on the display. - Press the START button again.

   1 63 will appear on the display when A4 size paper is used.

   1 36 will appear on the display when B4 size paper is used.

3. If a different number other than the above appears, turn **SW7** of the **Image processing PCB** until the correct number appears.

- Note -
- The actual width of master making will be 2mm narrower on each side, compared to the original.
- Turning SW7 to a larger number will increase the Master making width. Turning it to a smaller number will decrease the width.
- One notch of SW7 will change the Master making width by 1mm.

[Reference - Master making area definition according to loaded paper width]

	Paper Width (mm)	**Paper Size Det. Sensor Status**	**Defined Paper Size**	**Master Making Area** (Wide x Long)
Metric Models	307.0 ~ 292.0	Detection No Detection	A3 Portrait A4 Landscape	251.0 x 357.0 251.0 x 203.0
	291.5 ~ 268.5	Detection No Detection	No definition No definition	Paper width x 357.0 Paper width x 313.5
	268.0 ~ 252.0	Detection No Detection	B4 Portrait B5 Landscape	251.0 x 357.0 251.0 x 176.0
	251.5 ~ 226.5	Detection No Detection	No definition No definition	Paper width x 357.0 Paper width x 313.5
	226.0 ~ 206.0	Detection No Detection	Foolscap Portrait A4 Portrait	210.0 x 323.0 204.0 x 290.0
	205.5 ~ 192.5	Detection No Detection	No definition No definition	Paper width x 357.0 Paper width x 313.5
	192.0 ~ 178.0	Detection No Detection	No definition B5 Portrai	Paper width x 357.0 176.0 x 250.0
	177.5 ~ 67.9	Detection No Detection	No definition No definition	Paper width x 357.0 Paper width x 313.5
US Models	307.0 ~ 291.5 (12.1" ~ 11.5")	Detection No Detection	No definition No definition	Paper width x 357.0 (14.0") Paper width x 313.5 (12.3")
	291.0 ~ 274.0 (11.5" ~ 10.8")	Detection No Detection	Ledger Portrait Letter Landscape	251.0 (9.9") x 357.0 (14.0") 251.0 (9.9") x 208.0 (8.2")
	273.5 ~ 225.5 (10.8" ~ 8.9")	Detection No Detection	No definition No definition	Paper width x 357.0 (14.0") Paper width x 313.5 (12.3")
	225.0 ~ 211.0 (8.9" ~ 8.3")	Detection No Detection	Legal Portrait Letter Portrait	209.0 (8.2") x 349.0 (13.7") 209.0 (8.2") x 272.0 (10.7")
	210.5 ~ 150.5 (8.3" ~ 5.9")	Detection No Detection	No definition No definition	Paper width x 357.0 (14.0") Paper width x 313.5 (12.3")
	150.0 ~ 136.0 (5.9" ~ 5.4")	Detection No Detection	No definition Statement Portrait	Paper width x 357.0 (14.0") 134.0 (5.3") x 209.0 (8.2")
	135.5 ~ 67.9 (5.4" ~ 2.7")	Detection No Detection	No definition No definition	Paper width x 357.0 (14.0") Paper width x 313.5 (12.3")

7. Thermal Power of Thermal Print Head <GR3750/2750/1750>

1. Turn off the power.
2. Remove the Back cover.
3. Confirm the setting of **SW4** and **SW5** on the **Image processing PCB** is as described below.
   If not, set them at the correct positions.

SW4	E	SW5	D

4. Check the voltage value for thermal power, refering to the chart to the right according to the Resistance value (Ω) marked on the Thermal print head.
5. Open the Scanner table.
6. Remove the Master loading unit cover (top) by loosening two screws on the top and removing two screws in front.
7. Connect a voltmeter between pins **TP1 (+)** and **TP2 (GND)** on the **TPH Power PCB**, and disconnect the Jumper wire connector **TP3** on the PCB.
8. Close the Scanner table.
9. Turn ON the power and read the voltage on the voltmeter. Confirm the voltage reading conforms to the chart to the right.
10. If not, adjust **VR1** or **VR2** on the **TPH Power PCB**.
    (VR1 and VR2 can be reached through the opening under the Upper cover).
    VR1 = Fine adjustment VR2 = Rough adjustment
11. Turn OFF the power, and plug the Jumper wire connector **TP3** back on the PCB.

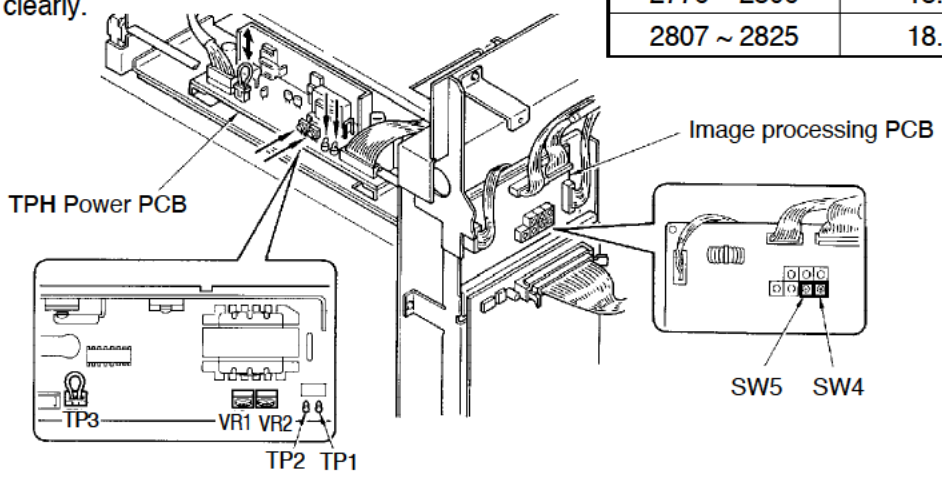
- Precautions In Adjustment -

- This adjustment has to be made every time the Thermal print head is replaced.
- The Scanner table should be closed to apply power to the Thermal print head. Otherwise, the Interlock sw will interrupt the power.

- Results of misadjustment -

- If the voltage is too high; solid print image will be deformed and the heating elements of the Thermal print head will be liable to damages due to overheat.
- If the voltage is too low; thin horizontal lines cannot be reproduced clearly.

Resistance (Ω)	Voltage (V)
2045 ~ 2067	15.7
2068 ~ 2093	15.8
2094 ~ 2120	15.9
2121 ~ 2146	16.0
2147 ~ 2173	16.1
2174 ~ 2200	16.2
2201 ~ 2227	16.3
2228 ~ 2255	16.4
2256 ~ 2282	16.5
2283 ~ 2310	16.6
2311 ~ 2338	16.7
2339 ~ 2366	16.8
2367 ~ 2394	16.9
2395 ~ 2422	17.0
2423 ~ 2451	17.1
2452 ~ 2479	17.2
2480 ~ 2508	17.3
2509 ~ 2537	17.4
2538 ~ 2566	17.5
2567 ~ 2596	17.6
2597 ~ 2625	17.7
2626 ~ 2655	17.8
2656 ~ 2685	17.9
2686 ~ 2715	18.0
2716 ~ 2745	18.1
2746 ~ 2775	18.2
2776 ~ 2806	18.3
2807 ~ 2825	18.4



8. Thermal Power of Thermal Print Head <GR2710>

1. Turn off the power.
2. Remove the Back cover.
3. Confirm the setting of **SW4** and **SW5** on the **Image processing PCB** is as described below.
   If not, set them at the correct positions.

SW4	E	SW5	D

4. Check the voltage value for thermal power, refering to the chart to the right according to the Resistance value (Ω) marked on the Thermal print head.
5. Open the Scanner table.
6. Remove the Master loading unit cover (top) by loosening two screws on the top and removing two screws in front.
7. Connect a voltmeter between pins **TP1 (+)** and **TP2 (GND)** on the **TPH Power PCB**, and disconnect the Jumper wire connector **TP3** on the PCB.
8. Close the Scanner table.
9. Turn ON the power and read the voltage on the voltmeter. Confirm the voltage reading conforms to the chart to the right.
10. If not, adjust **VR1** or **VR2** on the **TPH Power PCB**.
    (VR1 and VR2 can be reached through the opening under the Upper cover).
    VR1 = Fine adjustment VR2 = Rough adjustment
11. Turn OFF the power, and plug the Jumper wire connector **TP3** back on the PCB.

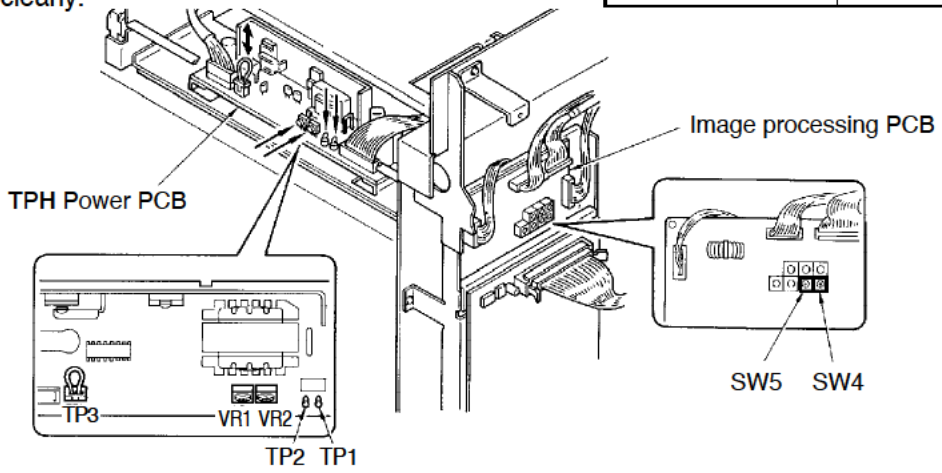
Resistance (Ω)	Voltage (V)
1400 ~ 1402	15.3
1403 ~ 1420	15.4
1421 ~ 1439	15.5
1440 ~ 1457	15.6
1458 ~ 1476	15.7
1477 ~ 1495	15.8
1496 ~ 1514	15.9
1515 ~ 1533	16.0
1534 ~ 1552	16.1
1553 ~ 1571	16.2
1572 ~ 1591	16.3
1592 ~ 1610	16.4
1611 ~ 1630	16.5
1631 ~ 1650	16.6
1651 ~ 1670	16.7
1671 ~ 1690	16.8
1691 ~ 1710	16.9
1711 ~ 1730	17.0
1731 ~ 1750	17.1
1751 ~ 1771	17.2
1772 ~ 1791	17.3
1792 ~ 1812	17.4
1813 ~ 1833	17.5
1834 ~ 1854	17.6
1855 ~ 1875	17.7
1876 ~ 1896	17.8
1897 ~ 1900	17.9

- Precautions In Adjustment -

- This adjustment has to be made every time the Thermal print head is replaced.
- The Scanner table should be closed to apply power to the Thermal print head. Otherwise, the Interlock sw will interrupt the power.

- Results of misadjustment -

- If the voltage is too high; solid print image will be deformed and the heating elements of the Thermal print head will be liable to damages due to overheat.
- If the voltage is too low; thin horizontal lines cannot be reproduced clearly.



9. Thermal Power of Thermal Print Head <GR1700>

1. Turn off the power.
2. Remove the Back cover.
3. Confirm the setting of **SW1** on the **Image processing PCB** is as described below.
   If not, set it at the correct position.

SW1	9

4. Check the voltage value for thermal power, refering to the chart to the right according to the Resistance value (Ω) marked on the Thermal print head.
5. Open the Scanner table.
6. Remove the Master loading unit cover (top) by loosening two screws on the top and removing two screws in front.
7. Connect a voltmeter between pins **TP1 (+)** and **TP2 (GND)** on the **TPH Power PCB**, and disconnect the Jumper wire connector **TP3** on the PCB.
8. Close the Scanner table.
9. Turn ON the power and read the voltage on the voltmeter. Confirm the voltage reading conforms to the chart to the right.
10. If not, adjust **VR1** or **VR2** on the **TPH Power PCB**. (VR1 and VR2 can be reached through the opening under the Upper cover).
    VR1 = Fine adjustment VR2 = Rough adjustment
11. Turn OFF the power, and plug the Jumper wire connector **TP3** back on the PCB.

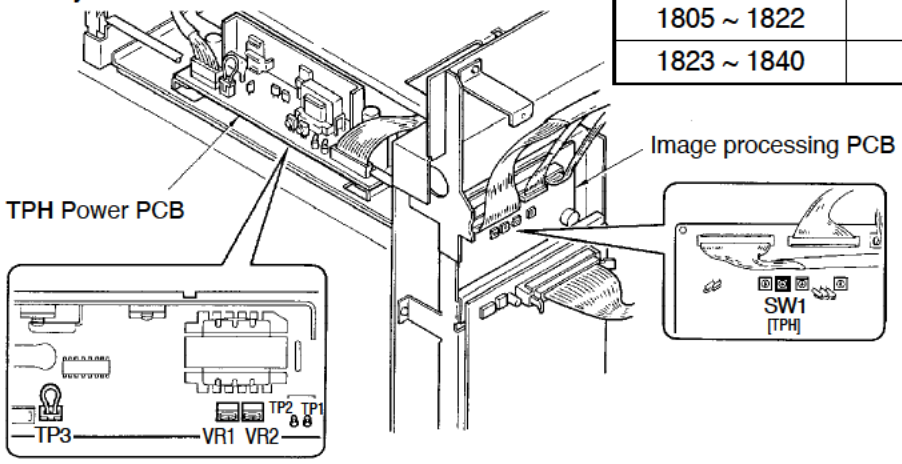
- Precautions In Adjustment -

- This adjustment has to be made every time the Thermal print head is replaced.
- The Scanner table should be closed to apply power to the Thermal print head. Otherwise, the Interlock sw will interrupt the power.

- Results of misadjustment -

- If the voltage is too high; solid print image will be deformed and the heating elements of the Thermal print head will be liable to damages due to overheat.
- If the voltage is too low; thin horizontal lines cannot be reproduced clearly.

Resistance (Ω)	Voltage (V)
1360 ~ 1365	17.7
1366 ~ 1381	17.8
1382 ~ 1397	17.9
1398 ~ 1413	18.0
1414 ~ 1429	18.1
1430 ~ 1445	18.2
1446 ~ 1461	18.3
1462 ~ 1477	18.4
1478 ~ 1494	18.5
1495 ~ 1510	18.6
1511 ~ 1527	18.7
1528 ~ 1543	18.8
1544 ~ 1560	18.9
1561 ~ 1577	19.0
1578 ~ 1594	19.1
1595 ~ 1611	19.2
1612 ~ 1628	19.3
1629 ~ 1645	19.4
1646 ~ 1663	19.5
1664 ~ 1680	19.6
1681 ~ 1697	19.7
1698 ~ 1715	19.8
1716 ~ 1733	19.9
1734 ~ 1750	20.0
1751 ~ 1768	20.1
1769 ~ 1786	20.2
1787 ~ 1804	20.3
1805 ~ 1822	20.4
1823 ~ 1840	20.5



10. Master Making Width <GR>

1. Place a sheet of paper with width of 210mm (A4 size paper) or 257mm (B4 size) on the Paper feed tray, and slide the Side guides against the paper.

2. Select Test mode **No. 91** and activate it.
   (On GR2710 or1710, 1 91 will appear on the display. Press the START key again.)

   - The A/D data "**90**" or 1 90 will appear on the display when A4 size paper is used.
   - The A/D data "**63**" or 1 63 will appear on the display when B4 size paper is used.

3. If a different number other than the above appears, turn **SW7** of the **Image processing PCB** until the correct number appears.

- Note -
- The actual width of master making will be 2mm narrower on each side, compared to the original.
- Turning SW7 to a larger number will increase the Master making width.
  Turning it to a smaller number will decrease the width.
- One notch of SW7 will change the Master making width by 1mm.

[Reference - Master making area definition according to loaded paper width]

	Paper Width (mm)	**Paper Size Det. Sensor Status**	**Defined Paper Size**	**Master Making Area** (Wide x Long)
Metric Models	307.0 ~ 292.0	Detection No Detection	A3 Portrait A4 Landscape	251.0 x 357.0 251.0 x 203.0
	291.5 ~ 268.5	Detection No Detection	No definition No definition	Paper width x 357.0 Paper width x 313.5
	268.0 ~ 252.0	Detection No Detection	B4 Portrait B5 Landscape	251.0 x 357.0 251.0 x 176.0
	251.5 ~ 226.5	Detection No Detection	No definition No definition	Paper width x 357.0 Paper width x 313.5
	226.0 ~ 206.0	Detection No Detection	Foolscap Portrait A4 Portrait	210.0 x 323.0 204.0 x 290.0
	205.5 ~ 192.5	Detection No Detection	No definition No definition	Paper width x 357.0 Paper width x 313.5
	192.0 ~ 178.0	Detection No Detection	No definition B5 Portrai	Paper width x 357.0 176.0 x 250.0
	177.5 ~ 67.9	Detection No Detection	No definition No definition	Paper width x 357.0 Paper width x 313.5
US Models	307.0 ~ 291.5 (12.1" ~ 11.5")	Detection No Detection	No definition No definition	Paper width x 357.0 (14.0") Paper width x 313.5 (12.3")
	291.0 ~ 274.0 (11.5" ~ 10.8")	Detection No Detection	Ledger Portrait Letter Landscape	251.0 (9.9") x 357.0 (14.0") 251.0 (9.9") x 208.0 (8.2")
	273.5 ~ 225.5 (10.8" ~ 8.9")	Detection No Detection	No definition No definition	Paper width x 357.0 (14.0") Paper width x 313.5 (12.3")
	225.0 ~ 211.0 (8.9" ~ 8.3")	Detection No Detection	Legal Portrait Letter Portrait	209.0 (8.2") x 349.0 (13.7") 209.0 (8.2") x 272.0 (10.7")
	210.5 ~ 150.5 (8.3" ~ 5.9")	Detection No Detection	No definition No definition	Paper width x 357.0 (14.0") Paper width x 313.5 (12.3")
	150.0 ~ 136.0 (5.9" ~ 5.4")	Detection No Detection	No definition Statement Portrait	Paper width x 357.0 (14.0") 134.0 (5.3") x 209.0 (8.2")
	135.5 ~ 67.9 (5.4" ~ 2.7")	Detection No Detection	No definition No definition	Paper width x 357.0 (14.0") Paper width x 313.5 (12.3")

11. Heating Rate of Thermal Print Head <GR>

1. Use Memory SW **No. 88** (Test mode No.88) to overcome set-off problems.
2. If the machine tends to have set-off problems even though the thermal power is adjusted correctly, use this Memory SW to reduce the thermal power of the Thermal head without changing the voltag setting.
3. Select the Memory SW **No. 88** and use the PRINT POSITION key on the operation panel to select a desired Memory SW setting number, referring to the chart below.
4. **To input the selected Memory SW setting into the machine, press the STOP key and then the ALL RESET key.**
   The panel display returns to an ordinary indication.

- Precautions in Adjustment -

- The once-input Memory SW setting cannot be erased even if Test mode **No.90** or **97** is activated or when the System ROM is replaced.
- The Memory SW setting is erased when the **System PCB** is replaced or when Test mode **No.98** is applied. In this case, all other Memory SW settings will also be erased.

Heating rate chart

Memory Sw Setting	0	1	2	3	4
TPH Heating Rate	100%	105%	95%	90%	85%

8.Master Removal Section

[Theory of Operation]

1. Clamp Plate Opening System * Timing chart is on the page VIII-4.

- Check of Master Presence on Drum

When the START button is pressed for master making or confidential operation, the Master sensor checks the presence of master on the Drum (after the Read and Write start signal is turned ON, in master making).

If the Master sensor finds master on the Drum, the Master removal sensor is activated.

- Opening of Clamp Plate

If the Position A sensor detects the Position A plate (if it is confirmed that the Drum is at the home position), at the same time, the Clamp solenoid is activated and the Clamp unit is pulled down, releasing the actuator of the Clamp safety switch (, which is pressed by the Clamp unit when the Clamp solenoid is not energized).

100 ms later, the Clamp motor starts rotating and opens the Clamp plate via gear engagement.

- Check of Opened Clamp Plate

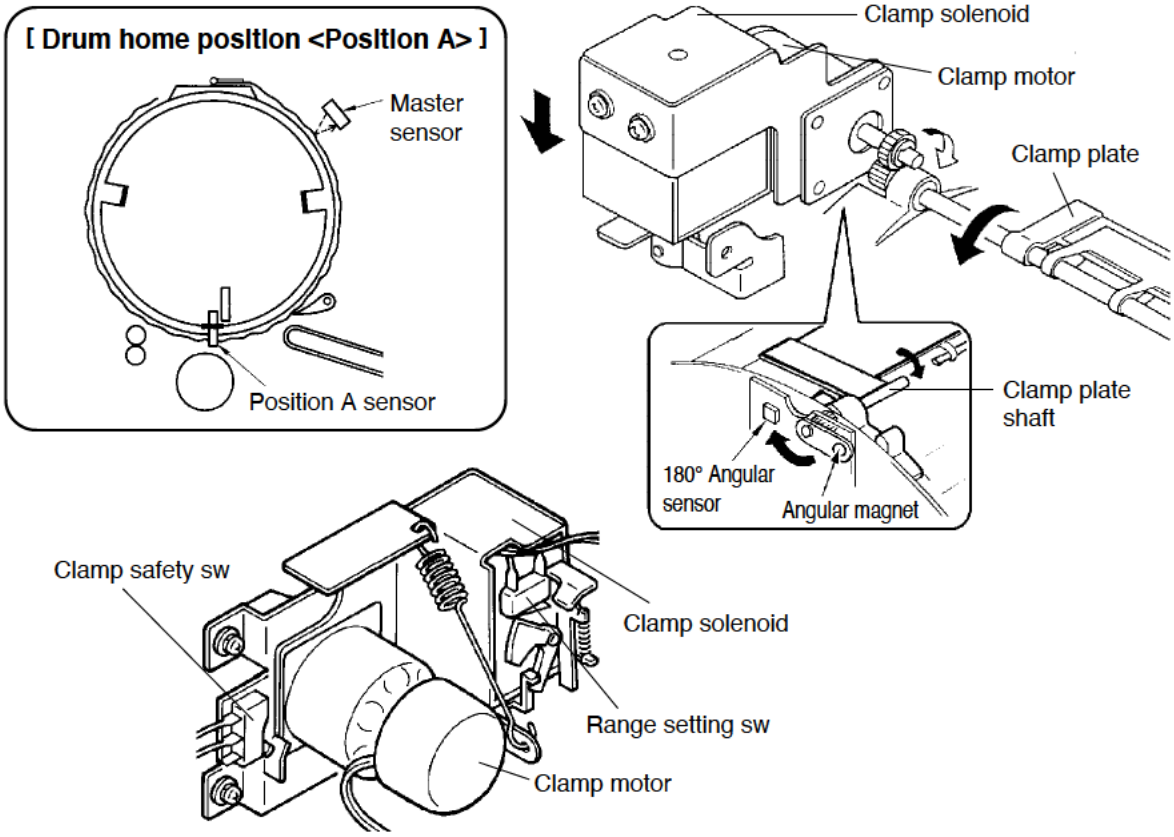
When the 180° Angular sensor detects the Angular magnet on the Angular magnet plate, which is attached to one end of the Clamp plate shaft, the Clamp motor and Clamp solenoid are deactivated.

- Finish of Clamp Plate Operation

When the Clamp solenoid is deactivated, the Clamp unit is returned to the initial (retreat) position and presses the actuator of the Clamp safety switch, by which it is confirmed that the operation of opening the Clamp plate is finished.

- Protection of Clamp Solenoid

When the Clamp solenoid is energized, the Range setting switch is actuated ON to reduce the current flowing through the solenoid for protecting it against overheat.



2. Master Removal System

- Start of Master Removal

When the Clamp safety switch is actuated ON by the Clamp unit, the Master removal vertical transport motor and Master removal solenoid are energized.
By the rotation of the M.-Rmv. vertical transport motor, the Vertical transport roller (down) is rotated via pulleys and belt. The rotation of the vertical transport roller (down) is transmitted to the Vertical transport roller (up) by gears, rotating both rollers together.
At the same time, the Master removal hooks are projected by the turn of the Master removal hook shaft activated by the energized Master removal solenoid.
100 ms later, the Main motor starts, rotating the Drum to remove a used master.
The lead edge of the released used master is caught by the Master removal hooks and advances into between the Vertical transport rollers (up) and (down).

- Finish of Master Removal

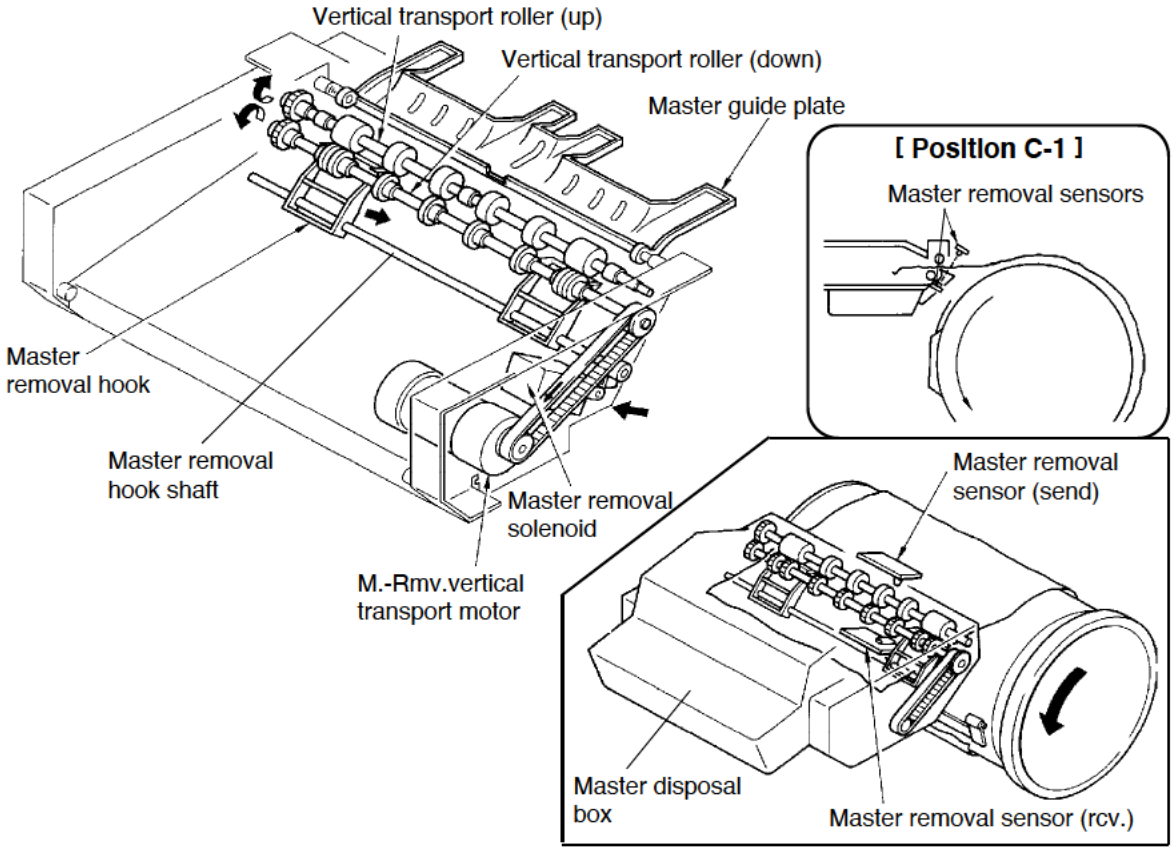
When the Drum reaches the Position A, the Main motor is turned off to stop the Drum.
2 seconds later, the M.-Rmv. vertical transport motor and Master removal solenoid are deenergized, to finish the master removal operation.

- Assistance in Master Removal Operation

The Separation fan operates and floats the top part of a released used master over the Drum, preventing the Master removal hooks from missing the master.
The Master guide plate prevents the released master from curling up and clearing the hooks.

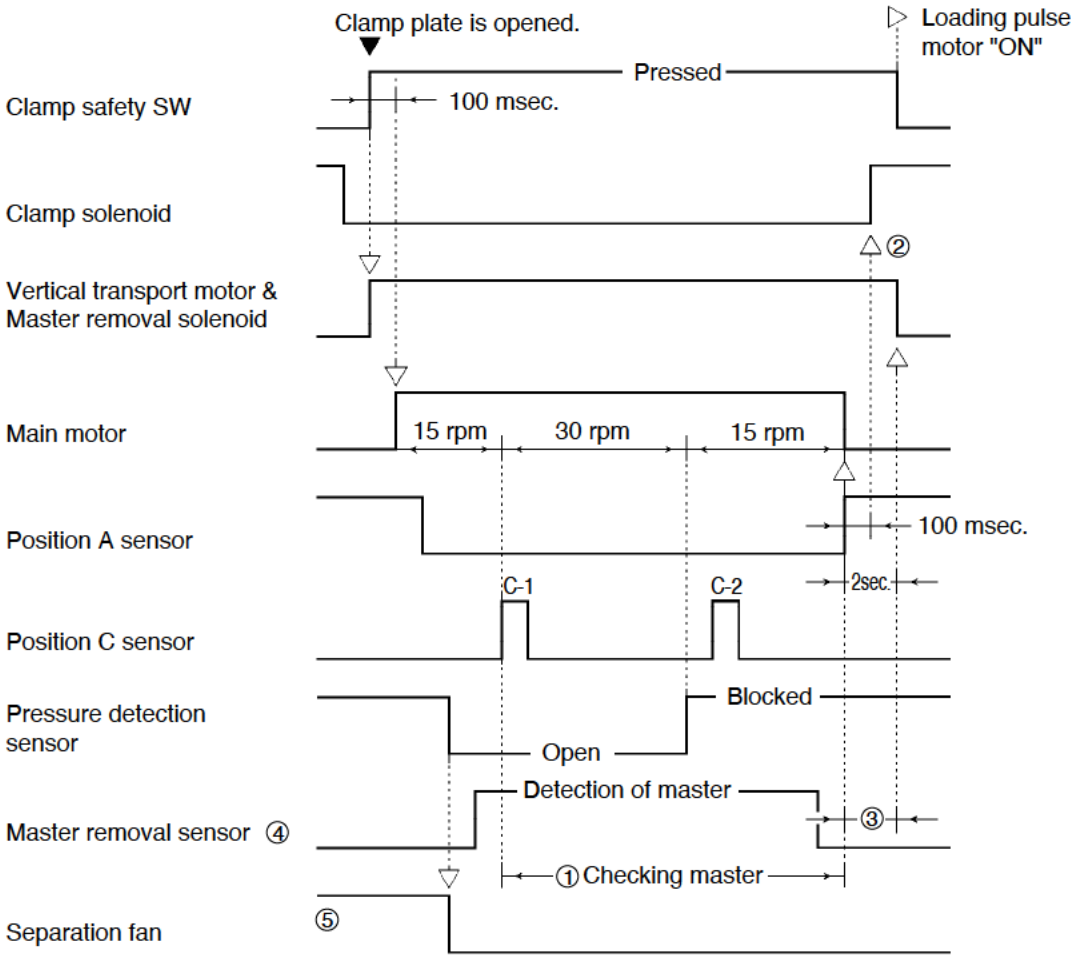
- Function of Master Removal Sensor

If master is detected on the Drum by the Master sensor at the start of the master removal operation, the Master removal sensor checks if the light path is blocked by the removed master while the Drum is rotated from the Position **C-1** up to **the Position A**, and if it is opened again **within 2 seconds** after the Drum returns to the Position A (the home position).



- Timing Chart -

Master Removal System



① The Master removal sensor is set active only when the Master sensor detects master on the Drum prior to master removal operation, to check the transportation of a used master during master removal operation.
When the light path of the Master removal sensor is blocked by a used master, the sensor checks if it is still blocked **0.5 seconds later**. If so, the machine assumes that the removed master is being transported into the Master disposal box without errors.
If the light path of the sensor has not been blocked since the **Position C-1** by the **Position A**, the machine assumes a Master removal error has occurred and indicates the error code **[E 25]**.

② If the Master removal sensor still detects a removed master when the Drum stops at the position A, the Clamp solenoid will not be energized until the light path of the sensor is opened.
(The waiting time is **2 seconds** at maximum.)

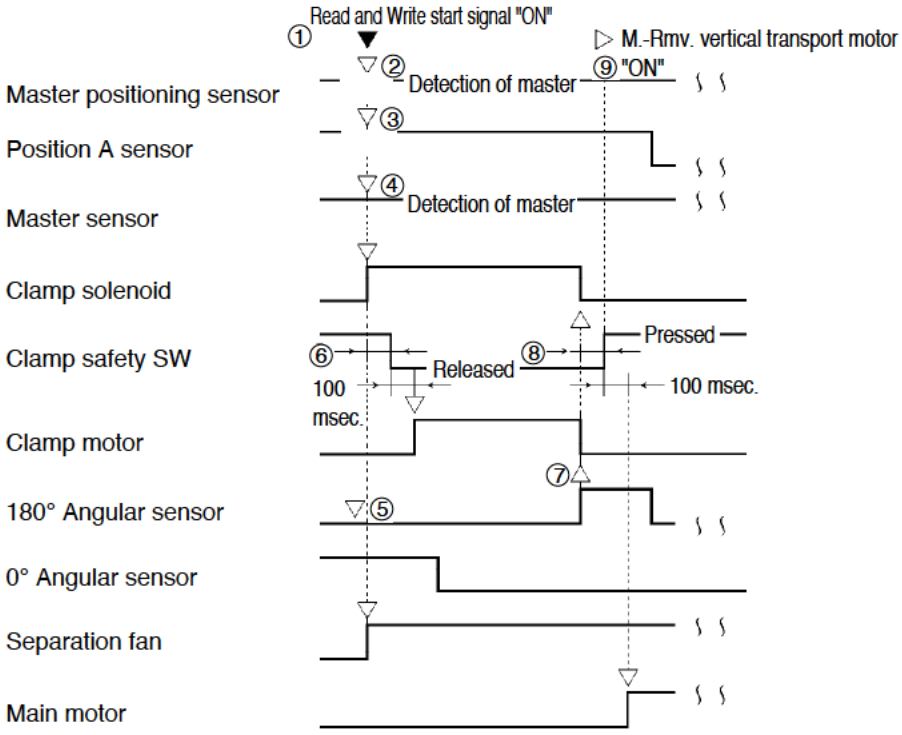
③ If the Master removal sensor has not been opened **within 2 seconds** after the Drum returns to the postion A, the machine assumes a removed master blocks up the entrance into the Master disposal box and indicates the error code **[E 25]**.

④ If the light path of the Master removal sensor is blocked in any time except master removal operation, the machine assumes that a removed master blocks up the entrance into the Master disposal box and indicates the error code **[E26]**.

⑤ As for the activation time of the Separation fan, refer to the timing chart on the page VIII-4.

- Timing Chart -

Clamp Plate Opening System



① When the Read and Write start signal is active, the Image scanner reads an original and the Thermal print head burns an image on a master.

② If the Master positioning sensor detects no master, master material is fed towards the Drum until the sensor detects the leading edge of master.
The Master positioning sensor is required to detect master material before the Clamp plate opening operation starts.

③ If the Position A sensor does not detect the Position A plate before the Clamp plate opening operation starts, the Drum rotates until the sensor detects the Position A plate.

④ If the Master sensor detects master on the Drum, the Master removal sensor is set active during master removal operation. If not, the Master removal sensor remains inactive.
In both cases, the Total master counter increases by 1.

⑤ If the 180° Angular sensor detects the Angular magnet, the next movement starts from ⑨.

⑥ If the Clamp safety switch has not been released OFF **within 4 seconds** after the Clamp solenoid is energized, the Clamp solenoid is deenergized and the Drum rotates once for the Position A. Then the Clamp solenoid is energized once again.
If the Clamp safety switch has not been released OFF **within 4 seconds** again, the machine assumes a Clamp error-1 has occurred and indicates the error code **[E 03]**.

⑦ If 180° Angular sensor has not detected a magnet **within 8 seconds** after the Clamp motor is activated, the Clamp motor and Clamp solenoid are deactivated and the Drum rotates once for the Position A. Then the Clamp motor and Clamp solenoid is activated once again.
If the magnet has not been detected by the 180° Angular sensor **within 8 seconds** again, the machine assumes a Clamp error-1 has occurred and indicates the error code **[E 03]**.

⑧ If the Clamp safety sw has not been pressed **within 4 seconds** after the Clamp solenoid is de-energized, the machine assumes a Clamp error-1 has occurred and displays the error code **[E 03].**

⑨ When the Clamp safety switch is actuated ON by the return of the Clamp solenoid, the Master removal vertical transport motor and Master removal solenoid are activated.

3. Master Removal System <GR>

- Start of Master Removal

When the Clamp safety switch is actuated ON by the Clamp unit, the Master removal vertical transport motor and Master removal solenoid are energized.

By the rotation of the M.-Rmv. vertical transport motor, the Vertical transport roller (down) is rotated via pulleys and belt. The rotation of the vertical transport roller (down) is transmitted to the Vertical transport roller (up) by gears, rotating both rollers together.

At the same time, the Master removal hooks are projected by the turn of the Master removal hook shaft activated by the energized Master removal solenoid.

100 msec later, the Main motor starts, rotating the Drum to remove a used master.

The lead edge of the released used master is caught by the Master removal hooks and advances into between the Vertical transport rollers (up) and (down).

- Finish of Master Removal

When the Drum reaches the Position A, the Main motor is turned off to stop the Drum.

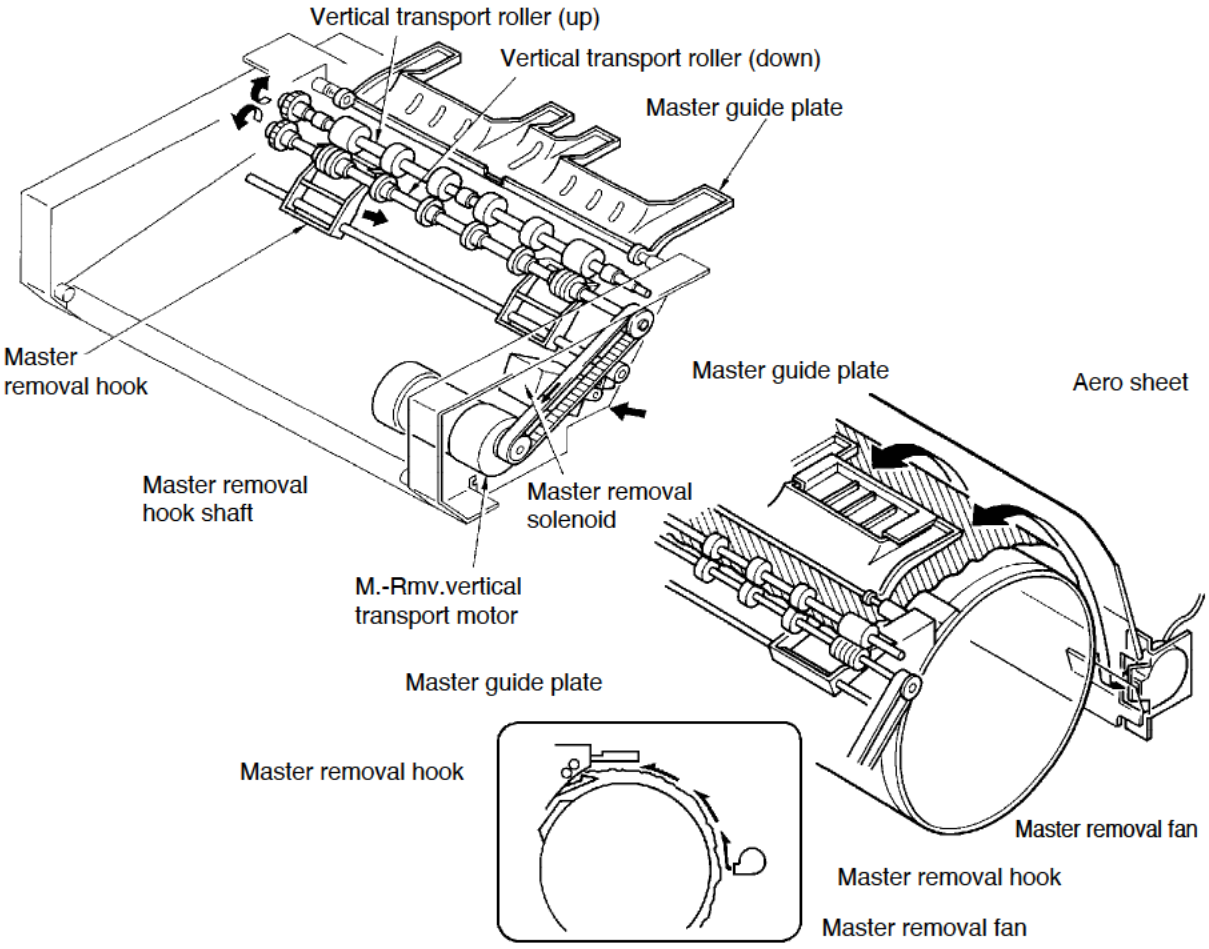
2 seconds later, the M.-Rmv. vertical transport motor and Master removal solenoid are deenergized, to finish the master removal operation.

- Assistance In Master Removal Operation

The Master removal fan operates and floats the top part of a released used master over the Drum, preventing the Master removal hooks from missing the master.

The fan is activated when the Drum comes to the Position A and deactivated at Position C-1 during the master removal.

Besides, the Master guide plate prevents the released master from curling up and clearing the hooks as well.



4. Master Removal Check System <GR>

- Check of Master Presence on Drum

The Master loading sensor checks the presence of master on the Drum at the start of the Master disposal operation (at the Position C-1).

- Check of Passage of Removed Master

If master is detected on the Drum by the Master loading sensor, the Master removal sensor checks if the light path is blocked by the removed master while the Drum is rotated from the Position **C-1** up to **the Position A**, and if it is opened again **within 2 seconds** after the Drum returns to the Position A (the home position).

- Detection of Master Removal Jam

The Master removal hook sensor checks whether the hooks are correctly returned to their home position when the Master removal solenoid is not activated.

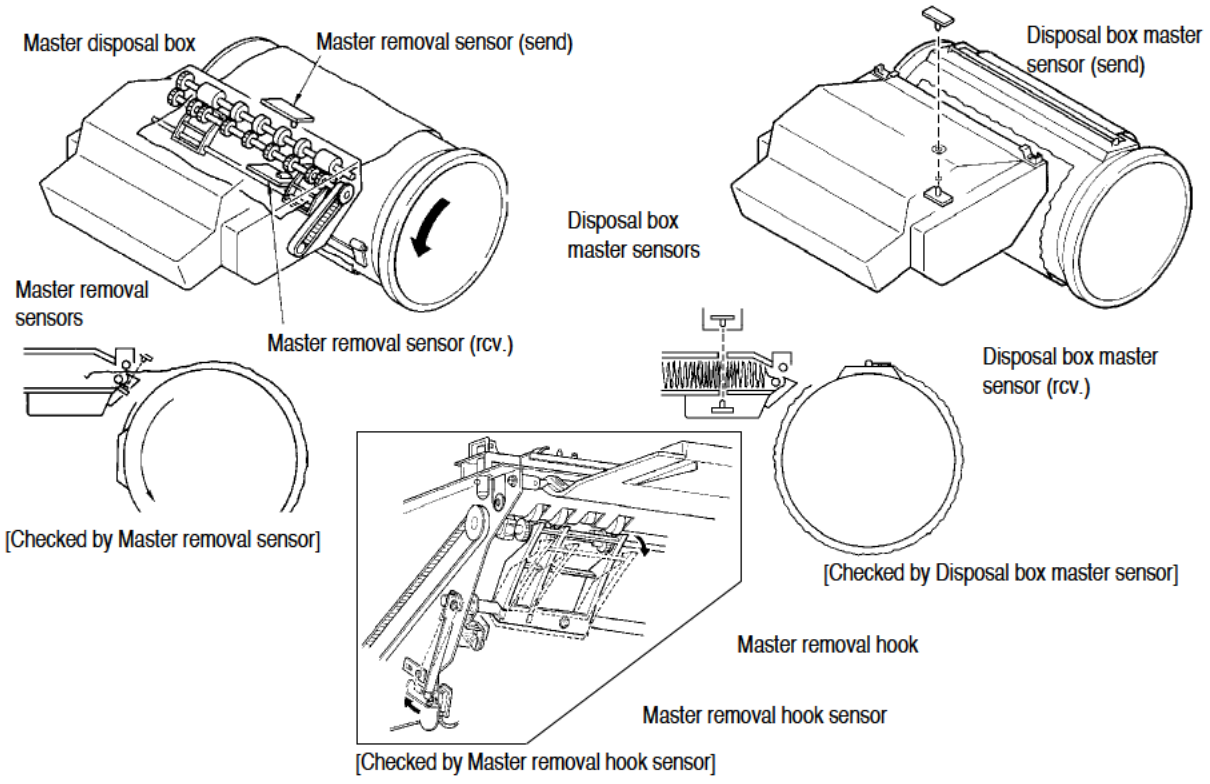
If the light path of the Master removal hook sensor is not blocked while the machine is in idle, it is assumed that the removed master is jammed on the Master removal hooks and the error message "**REMOVE JAMMED MASTER IN DISPOSAL UNIT**" or **[E 26]** is displayed.

The same error message is diplayed if the light path of the Master removal sensor is blocked, assuming that the removed master is jammed.

- Check of Quantity of Disposed Masters

The Master removal sensor counts the number of masters that go into the Master disposal box. The master disposal count is increased by one each time the light path of the sensor is blocked and the message or LED indicatoin "**EMPTY DISPOSAL BOX**" is displayed when the count accumulated in the RAM memory on the System PCB reaches the set amount (**30** for GR3750 and **50** for other models).

The Disposal box master sensor checks the presence of disposed masters inside the Master disposal box. The master disposal count is only reset to "0" if the Disposal box master sensor confirms no master remains in the box after the Master disposal box is pulled out to discard used masters due to the "EMPTY DISPOSAL BOX" indication.


Master disposal box
Master removal sensor (send)
Disposal box master sensor (send)
Disposal box master sensors
Master removal sensors
Master removal sensor (rcv.)
Disposal box master sensor (rcv.)
[Checked by Master removal sensor]
[Checked by Disposal box master sensor]
Master removal hook
Master removal hook sensor
[Checked by Master removal hook sensor]

8.Master Removal Section

[Removal and Assembly]

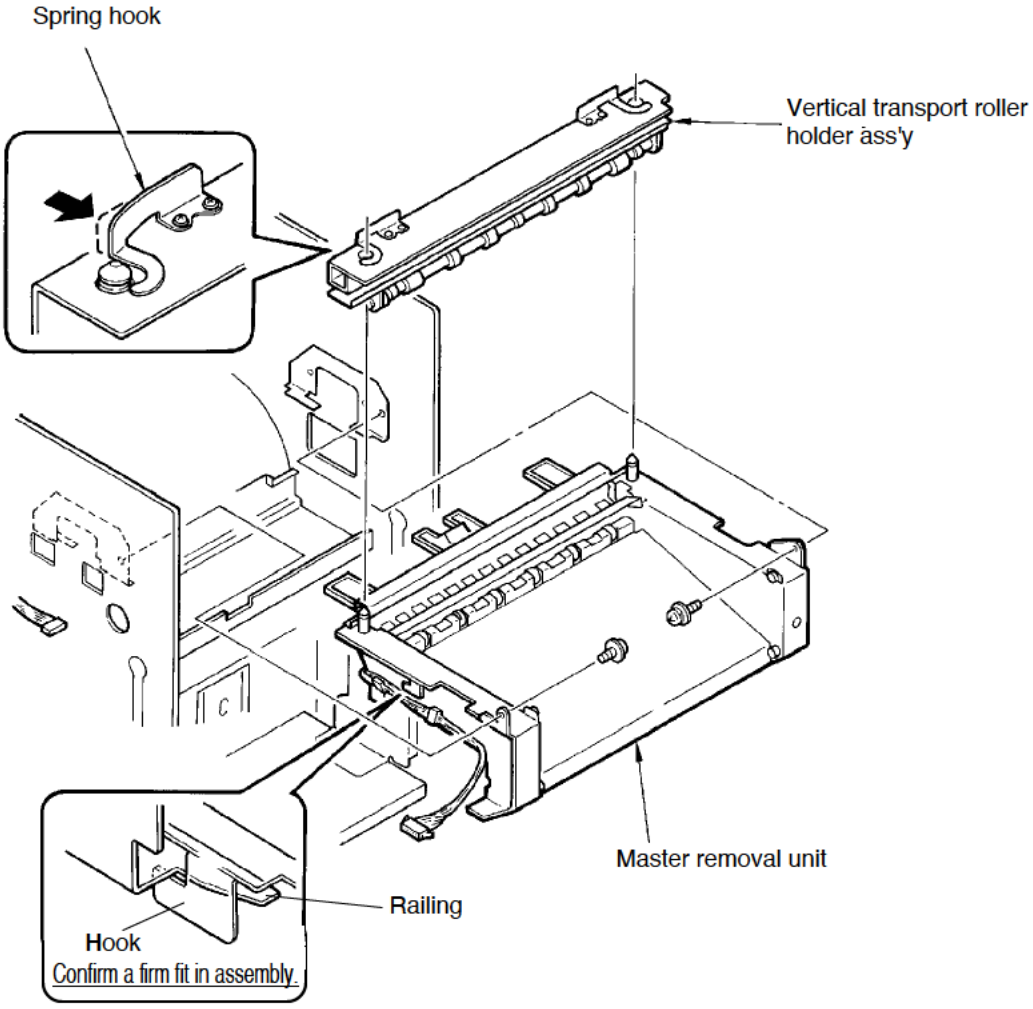
1. Master Removal Unit (4200/4900)

< Removal Procedure >

1. Turn OFF the power and pull out the Master disposal box from the machine.
2. Remove the Back cover and disconnect the wire harness connector of the Master removal unit.
3. Remove two mounting screws on the Master removal unit.
   [Note]
   If required, push two Spring hooks on the Vertical transport roller holder ass'y to free the ass'y from the Master removal unit.
4. Pull the unit towards the paper feed side to unlock the hooks at the bottom of the unit.
   Tip the unit toward you and take it out towards the paper feed side.

- Precautions In Assembly -

- Pass the wire harness of the Master removal unit through the hole of the side frame of the machine before installing the unit into the machine.
- Make sure to lock the hooks at the bottom of the unit on the railings of the side frames.



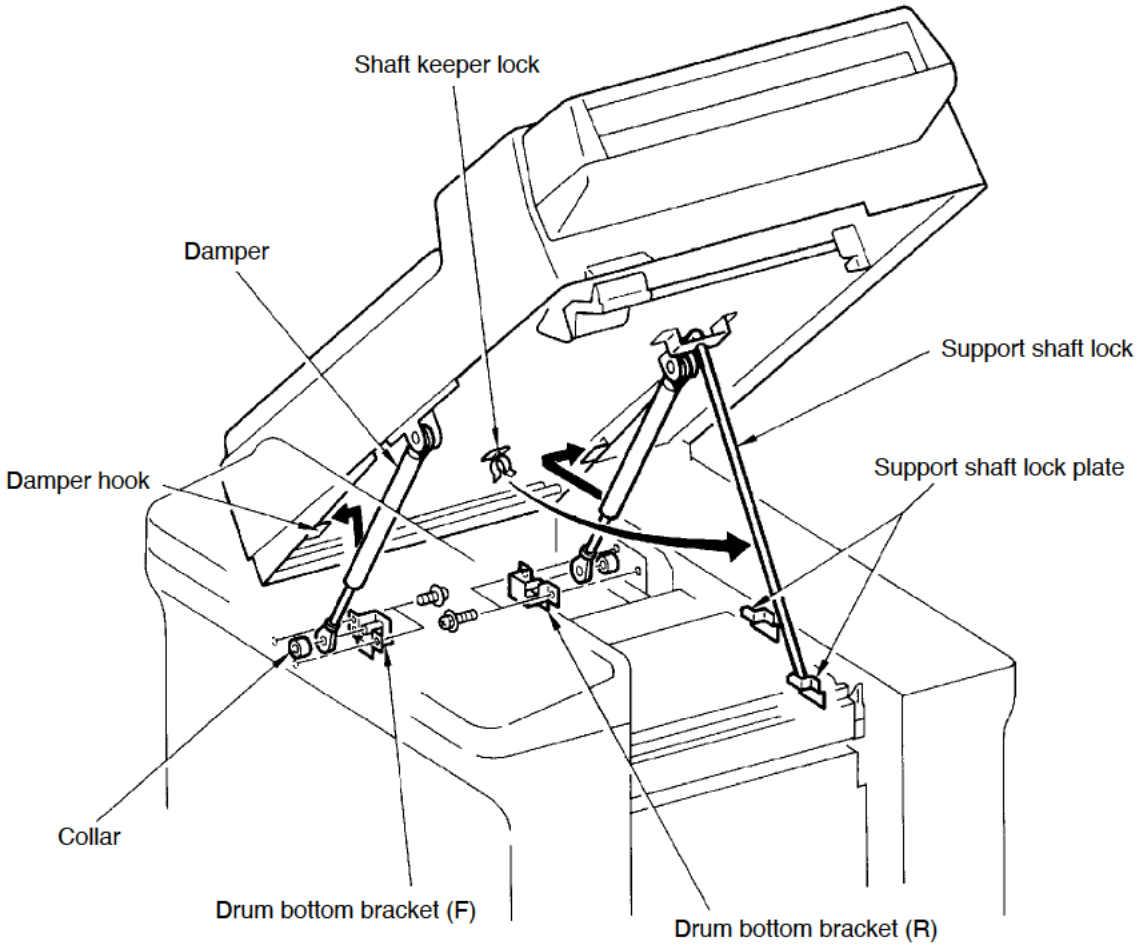
2. Master Removal Unit (5900)

< Removal Procedure >

1. Turn OFF the power and open the Scanner table.
2. Release the Support shaft lock from the Shaft keepre lock and hook it to the lower Support shaft lock plate
3. Remove the respective two mounting screws on the Damper bottom brackets (F) and (R), and remove the brackets.
   [IMPORTANT]
   Don't drop the collar on the shaft of the bracket, located behind the Damper.
4. Hook the Dampers on the Damper hooks at the bottom of the Scanner table.
   [CAUTION]
   Don't open the Scanner table too wide after releasing the Dampers because the machine will be turned over by the weight of the Scanner table.
5. Pull out the Master disposal box from the machine.
6. Remove the Master removal unit, referring to the previous page.

- Precautions In Assembly -

- Make sure to attach the Damper bottom brackets to the same positions as before removal because the brackets are different in shape.
- The collar should be inserted between the Damper and the machine side frame.



3. Master Removal Solenoid

< Removal Procedure >

1. Remove the Master removal unit, referring to the page VIII-5 or VIII-6.
2. Cut the wire clamper holding the wires of the Master removal solenoid and disconnect the connector of the solenoid.
3. Remove the mounting screw of the Master removal solenoid, and remove the solenoid from the unit.
4. Separate the bracket from the Master removal solenoid by removing two mounting screws.

- Precautions In Assembly -

- Secure the solenoid so that the positioning bosses on the bracket can be placed in the middle of the oblong holes of the unit frame.
- Make sure to secure the wires of the solenoid with a wire clamper as before removal.

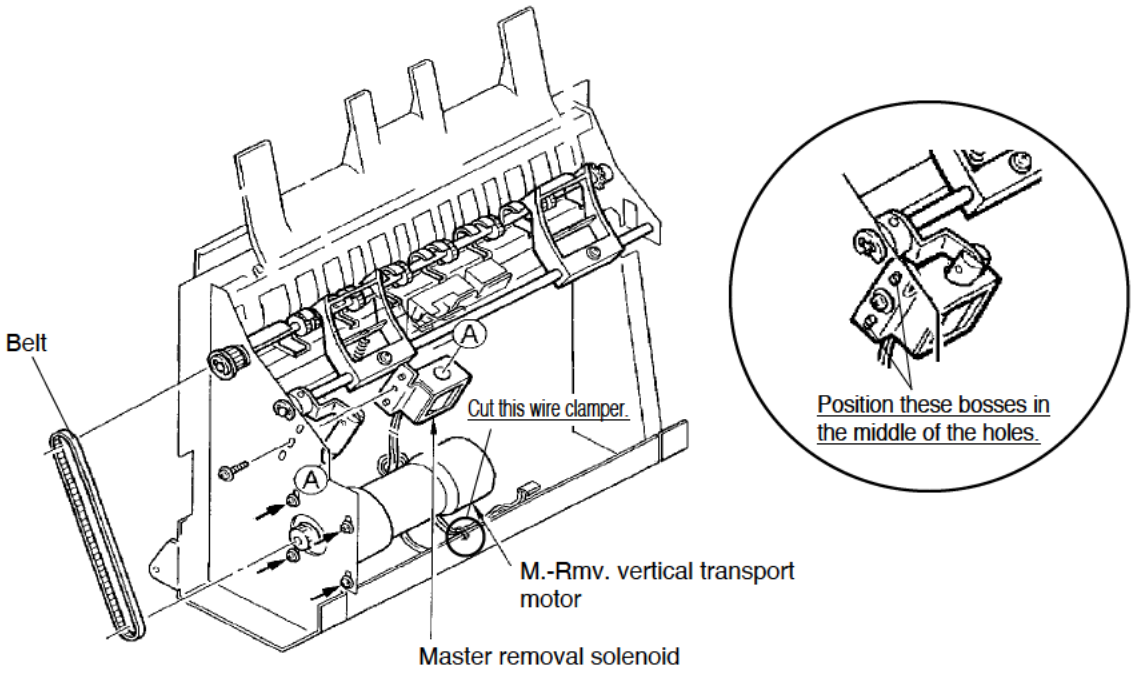
4. M.-Rmv. Vertical Transport Motor

< Removal Procedure >

1. Remove the Master removal unit, referring to the page VIII-5 or VIII-6.
2. Cut the wire clamper holding the wires of the M.-Rmv. vertical transport motor and disconnect the connector of the motor.
3. Remove four mounting screw of the M.-Rmv. vertical transport motor, and remove the motor from the unit, releasing the belt.
4. Separate the Duct pulley from the M.-Rmv. vertical transport motor by loosening the allen screw.

- Precautions In Assembly -

- Make sure to push the Duct pulley fully on the motor shaft before securing it.
- Make sure to apply good tension to the belt when securing the motor.
- Make sure to secure the wires of the motor with a wire clamper as before removal.



5. Master Removal Hook
6. Vertical Transport Roller (Up)

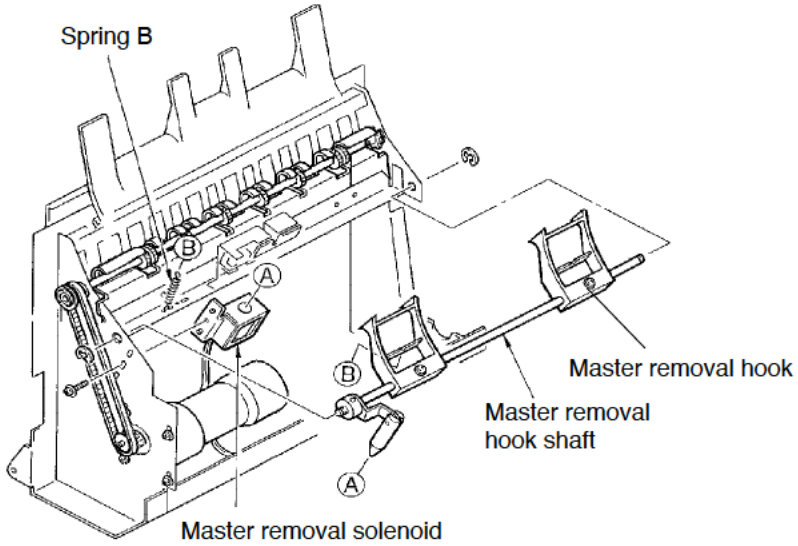
5. Master Removal Hook

< Removal Procedure >

1. Remove the Master removal unit, referring to the page VIII-5 or VIII-6.
2. Remove the mounting screw of the Master removal solenoid and set aside the solenoid.
3. Remove the Spring B.
4. Remove E rings at both ends of the Master removal hook shaft, and remove the shaft with the Master removal hooks attached.
5. Remove the screw securing the Master removal hook on the shaft and slide it off the shaft.

- Precautions In Assembly -

- Secure the Master removal solenoid so that the positioning bosses on the bracket can be placed in the middle of the oblong holes of the unit frame.
- Always check the projected position of the Master removal hooks after assembly.



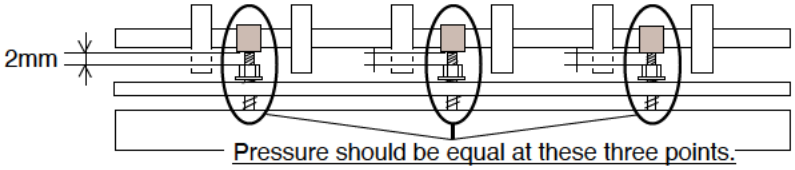
6. Vertical Transport Roller (Up)

< Removal Procedure >

1. Pull out the Master disposal box from the machine and remove the Vertical transport roller holder ass'y, referring to the page VIII-5. (The Master removal unit is not required to be removed.)
2. Remove E rings at both ends of the Vertical transport roller (up), and remove metal bearings.
3. Move the Vertical transport roller (up) sideways and remove the roller from the holder ass'y.
4. Remove the E ring securing the gear on the shaft and separate the gear from the roller.
   [IMPORTANT]
   Be careful not to lose a parallel pin which is inserted into the shaft when removing the gear.

- Precautions In Assembly -

- Confirm after assembly that the same pressure is applied to the roller at all three points by spring screws.



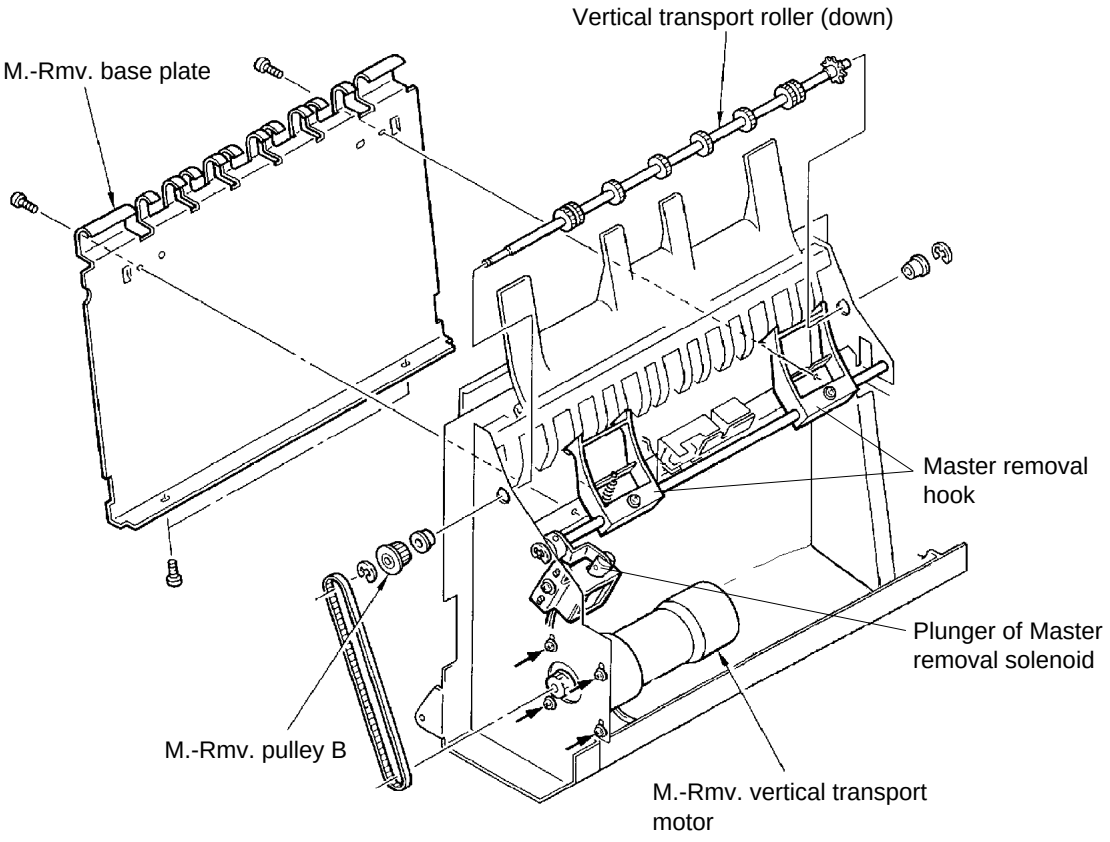
7. Vertical Transport Roller (Down)

< Removal Procedure >

1. Remove the Master removal unit, referring to the page VIII-5 or VIII-6.
2. Remove the Vertical transport roller holder ass'y, referring to the page VIII-5.
3. Loosen four mounting screws of the M.-Rmv. vertical transport motor and remove the belt from the M.-Rmv. pulley B.
4. Remove E rings at both ends of the Vertical transport roller (down), and remove the M.-Rmv. pulley B and metal bearings.
5. Remove four mounting screws on the M.-Rmv. base plate and unhook the plate from the shaft of the Vertical transport roller (down).
6. Holding down the plunger of the Master removal hooks to set the hooks off the Vertical transport roller (down), move the roller sideways to remove it.
7. Remove the E ring securing the gear on the shaft and separate the gear from the roller.
   [IMPORTANT]
   Be careful not to lose a parallel pin which is inserted into the shaft when removing the gear.

- Precautions in Assembly -

- Confirm that the M.-Rmv. pulley B is attached to the shaft in the right direction (the collared side should face outward) because an one-way clutch is built in the pulley.
- Make sure to match the positioning holes on the top face of the M.-Rmv. base plate with the bosses on the Master removal unit frame when securing the plate.
- Make sure to apply good tension to the belt when securing the M.-Rmv. vertical transport motor.



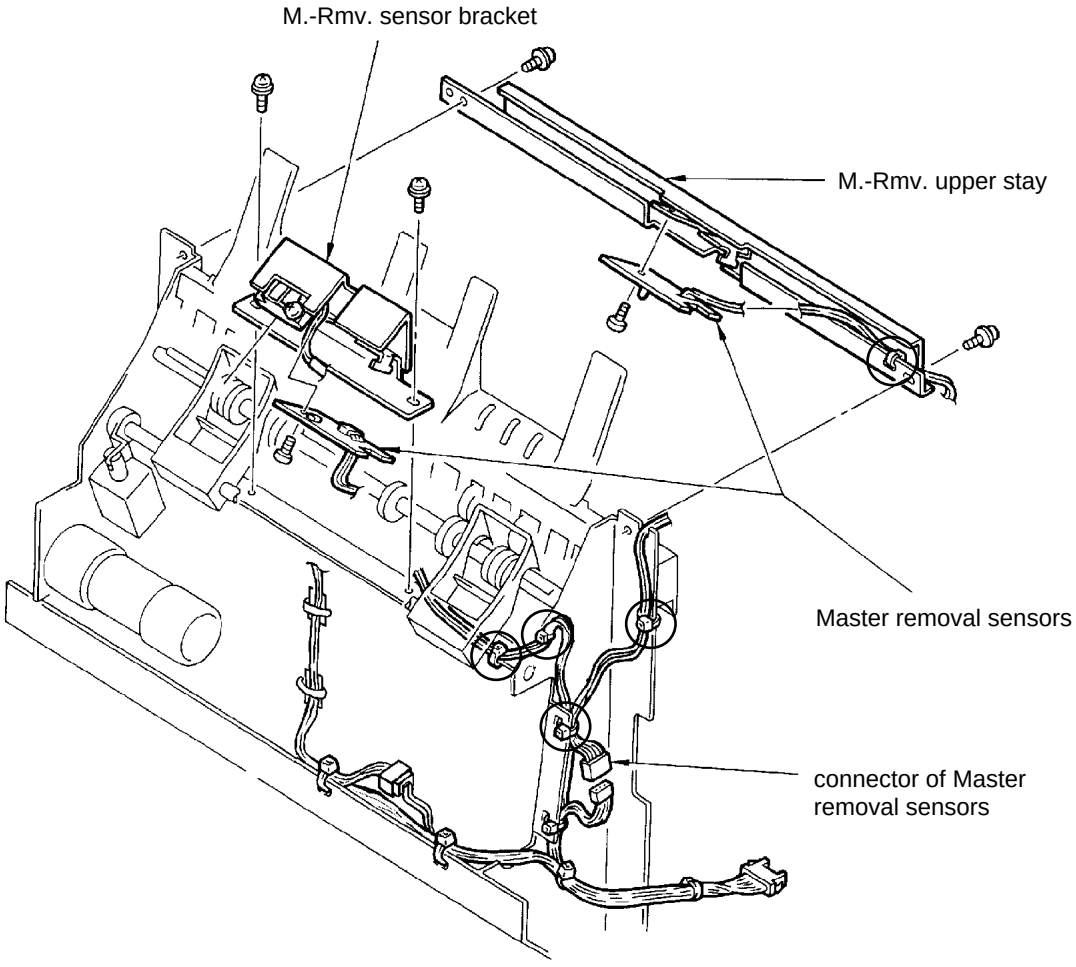
8. Master Removal Sensors

< Removal Procedure >

1. Remove the Master removal unit, referring to the page VIII-5 or VIII-6.
2. Remove two mounting screws on the M.-Rmv. upper stay and set aside the upper stay.
3. Remove the mounting screw on the Master removal sensor (send), cut the wire clamper securing the wires of the sensor to the M.-Rmv. upper stay and remove the sensor from the upper stay.
4. Remove two mounting screws on the M.-Rmv. sensor bracket and set aside the bracket.
5. Remove the mounting screw on the Master removal sensor (receive), and remove the sensor from the bracket.
6. Disconnect the connector of the Master removal sensors and cut the wire clampers securing the wires of the sensors to the Master removal unit frame.

- Precautions in Assembly -

- The Master removal sensor (send) is the one with a VR attached.
- Make sure to match the positioning holes of the M.-Rmv. sensor bracket with the bosses on the Master removal unit stay when securing the bracket.
- Make sure to secure the wires of the sensors with wire clampers (5 points) as before removal, referring to the figure below.



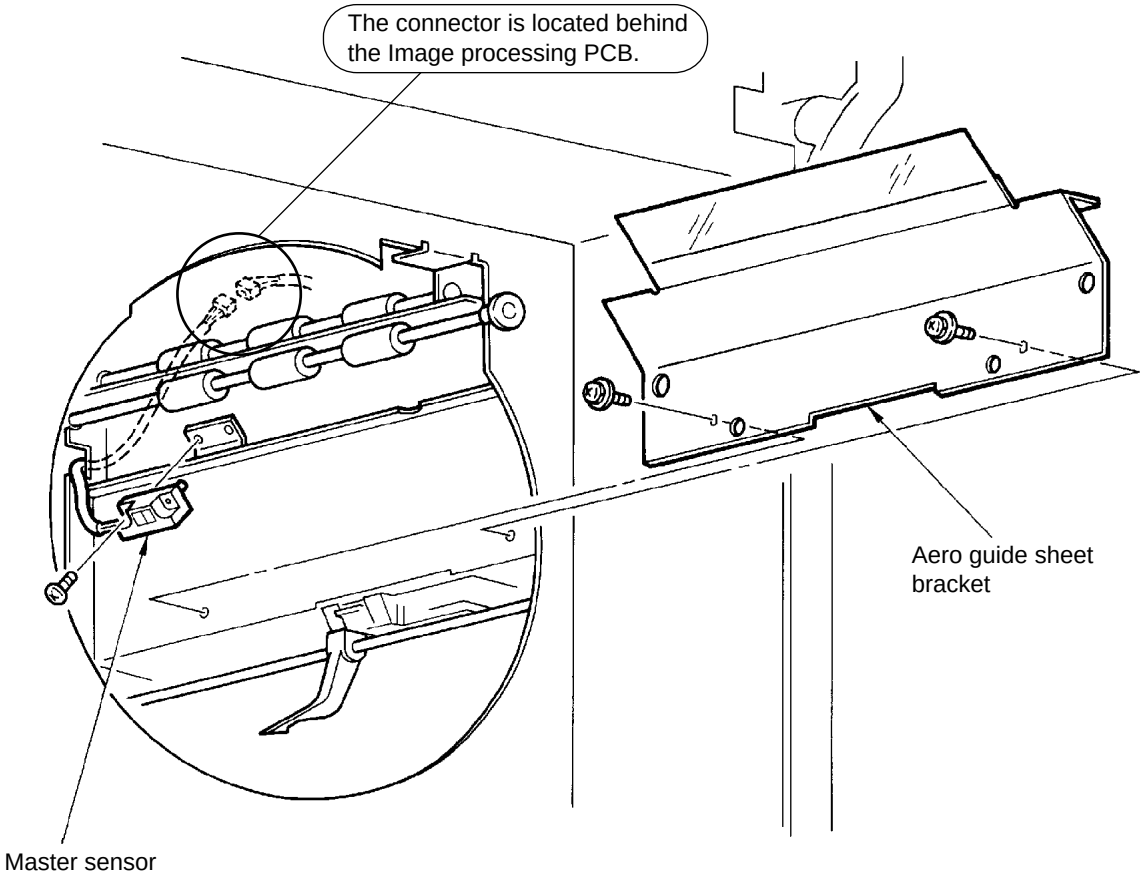
9. Master Sensor

< Removal Procedure >

1. Take out the Drum from the machine.
2. Turn OFF the power and remove the Back cover.
3. Remove two mounting screws on the Aero guide sheet bracket and remove the bracket.
4. Remove 5 mounting screws on the System PCB brackets and set aside the PCB ass'y to make room for disconnecting the connector.
5. Disconnect the connector of the Master sensor and release the wires of the sensor from a flexible wire clamper.
6. Remove the mounting screw on the Master sensor, and remove the sensor from the bracket.

- Precautions in Assembly -

- Take care not to let the wires of the sensor hang behind the Aero guide sheet bracket and Loading pulse motor.
- After assembly, confirm that the connectors on the System PCB and Image processing PCB are securely connected.



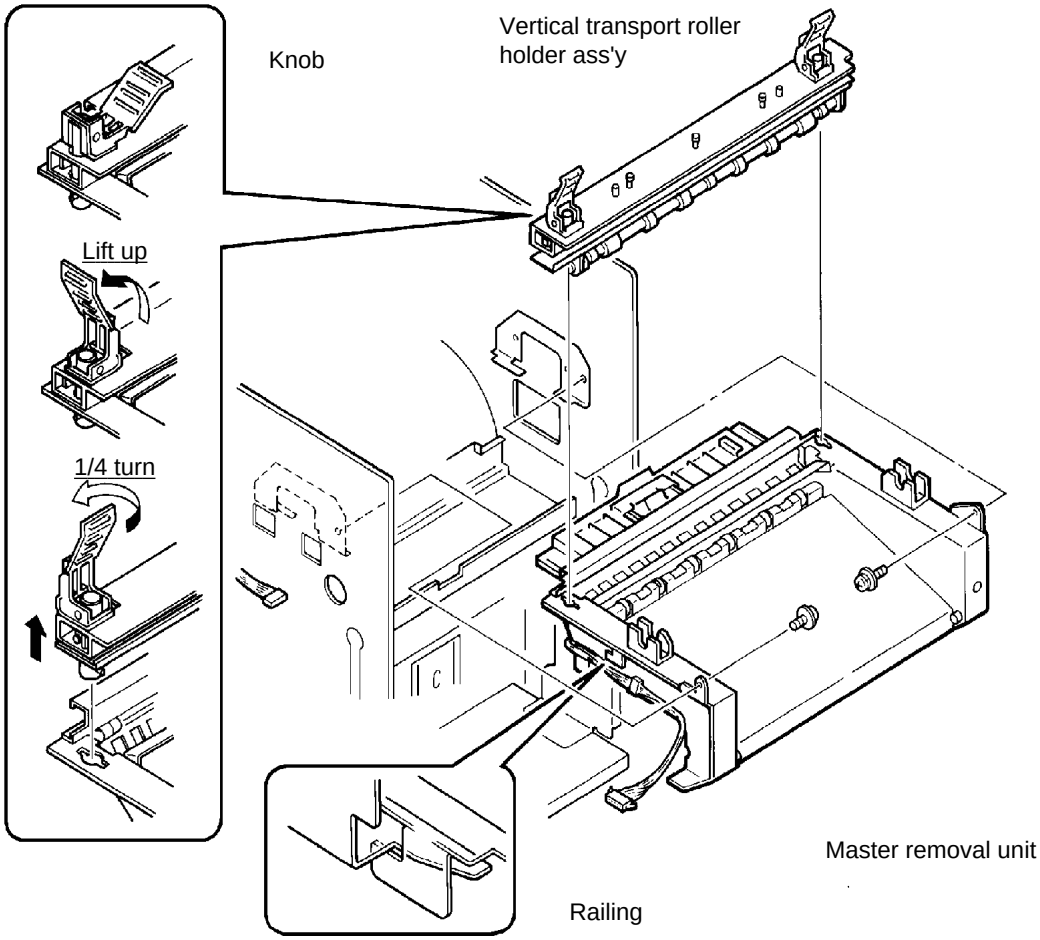
10. Master Removal Unit <GR1750/1700>

< Removal Procedure >

1. Turn OFF the power and pull out the Master disposal box from the machine.
2. Remove the Back cover and disconnect the wire harness connector of the Master removal unit.
3. Remove two mounting screws on the Master removal unit.
   [Note]
   If required, lift and make a quarter turn on the two Knobs on the Vertical transport roller holder ass'y to free the ass'y from the Master removal unit.
4. Pull the unit towards the paper feed side to unlock the hooks at the bottom of the unit.
   Tip the unit toward you and take it out towards the paper feed side.

- Precautions in Assembly -

- Pass the wire harness of the Master removal unit through the hole of the side frame of the machine before installing the unit into the machine.
- Make sure to lock the hooks at the bottom of the unit on the railings of the side frames.



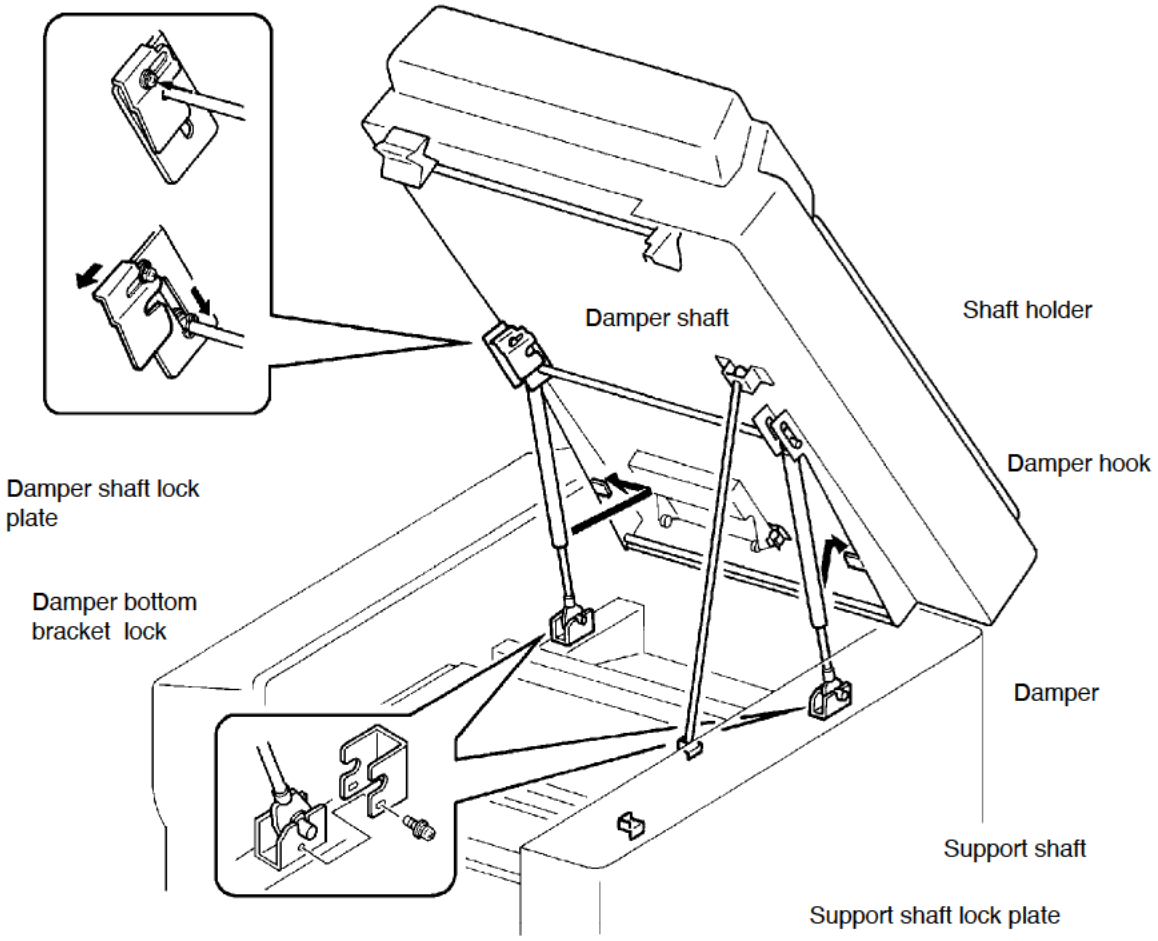
11. Master Removal Unit <GR3750/2750/2710>

< Removal Procedure >

1. Turn OFF the power and open the Scanner table.
2. Loosen the screw on the Damper shaft lock plate and slide the plate and release the shaft.
3. Release the Support shaft from the Shaft holder and hook it to the lower Support shaft lock plate, while lifting the Scanner table.
4. Remove the mounting screws on the Damper bottom bracket lock plates and remove the brackets.
5. Hook the Dampers on the Damper hooks at the bottom of the Scanner table.
   [CAUTION]
   Don't open the Scanner table too wide after releasing the Dampers because the machine will be turned over by the weight of the Scanner table.
6. Remove the Master removal unit, referring to the next page.

- Precautions In Assembly -

- Make sure to secure the Damper bottom bracket lock plates firmly on the brackets.



12. Master Removal Hook Sensor <GR>

< Removal Procedure >

1. Remove the Master removal unit, referring to the pages from VIII-12-GR36 to VIII-12-GR37.
2. Remove the mounting screw on the sensor bracket.
3. Disconnect the connector of the Master removal hook sensor.
4. Carefully remove the sensor from the bracket.

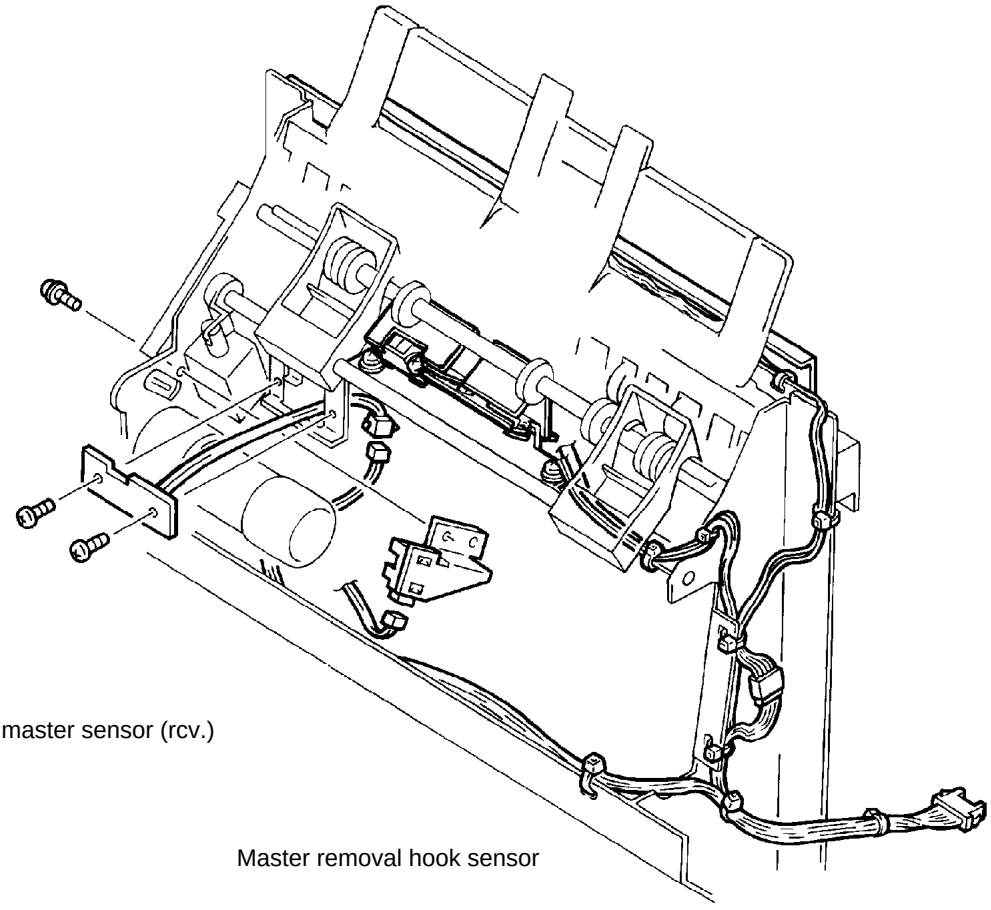
- Precautions in Assembly -

- Make sure to position the sensor so that the light path of the sensor is blocked when the Master removal hooks are not projected out, i.e. home position.

13. Disposal Box Master Sensor (Rcv.) <GR>

< Removal Procedure >

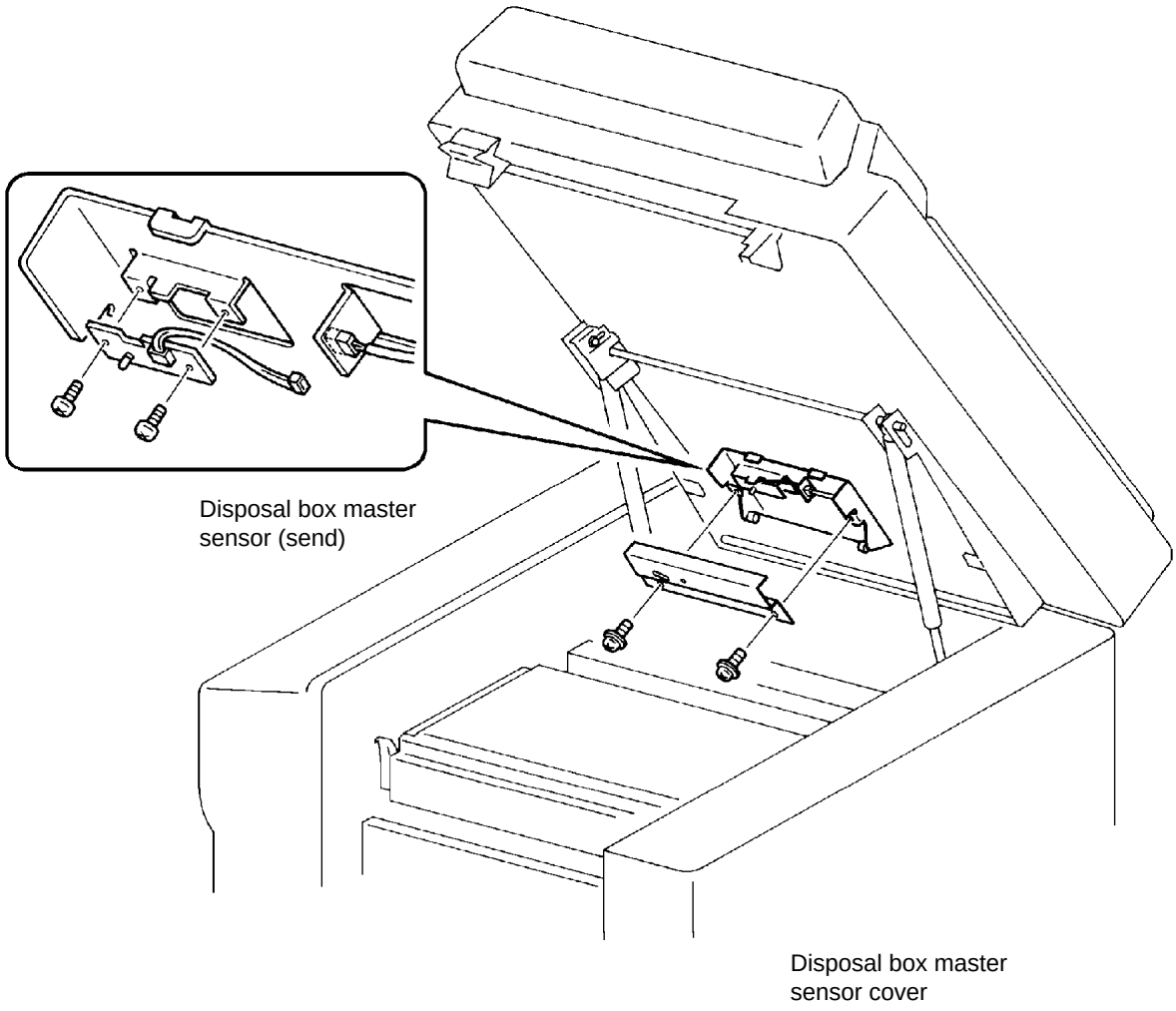
1. Remove the Master removal unit, referring to the pages from VIII-12-GR36 to VIII-12-GR37.
2. Remove the mounting screw on the Disposal box master sensor (rcv.) and disconnect the connector.



14. Disposal Box Master Sensor (Send) <GR3750/2750/2710>

< Removal Procedure >

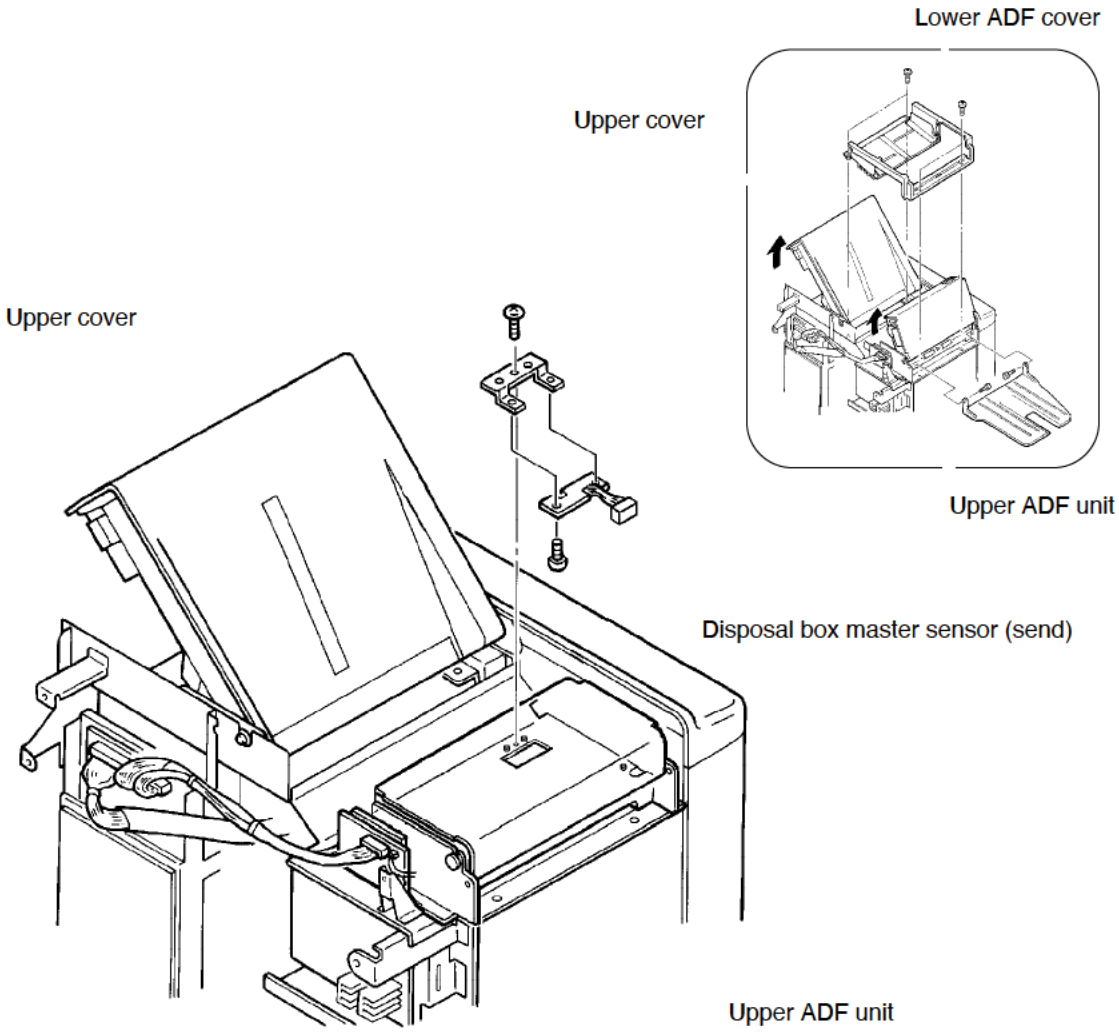
1. Turn OFF the power, open the Scanner table and remove the Master disposal box.
2. Remove two mounting screws on the Disposal box master sensor cover and remove the cover.
3. Remove two mounting screws on the Disposal box master sensor (send), disconnect the connector and remove the sensor.



15. Disposal Box Master Sensor (Send) <GR1750/1700>

< Removal Procedure >

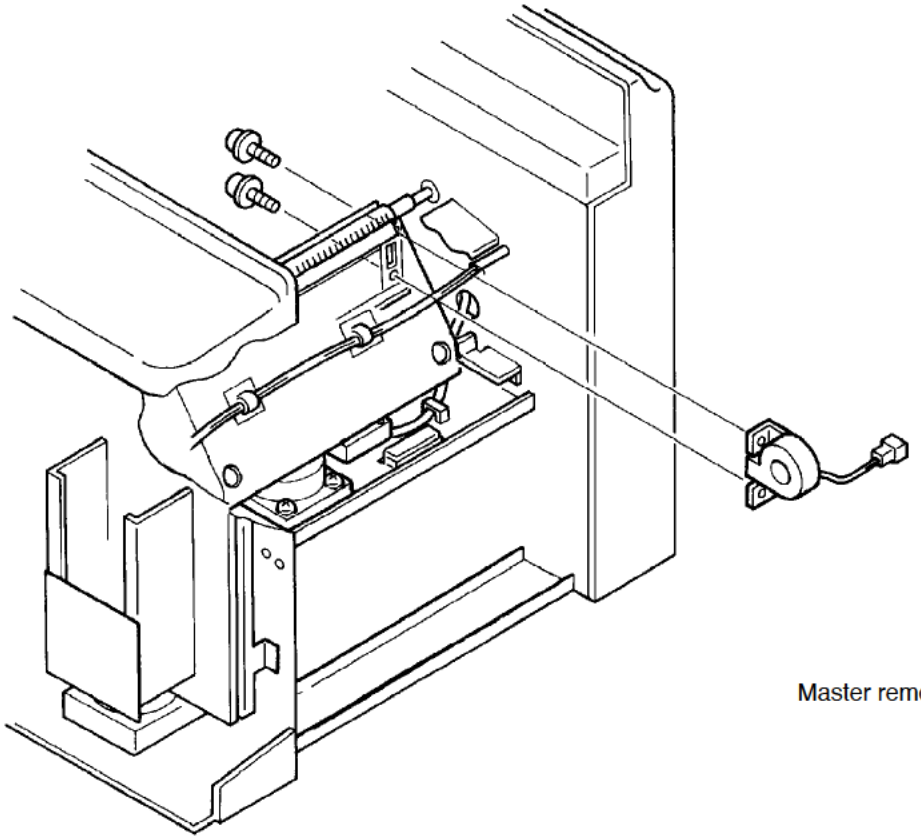
1. Turn OFF the power.
2. Open the Upper cover and Upper ADF unit.
   Remove four mounting screws on the Lower ADF cover and remove the cover, referring to the page V-10 or sketch below.
3. Disconnect the connector of the Disposal box sensor (send) and remove one mounting screw of the sensor bracket, and remove the bracket with the sensor attached.
4. Remove two mounting screws of the Disposal box master sensor (send) and remove the sensor from the bracket.



16. Master Removal Fan <GR>

< Removal Procedure >

1. Remove the Master roller holder unit, referring to the page III-14.
2. Remove two mounting screws of the Aero guide sheet and remove the sheet, referring to the page IX-24-GR43.
3. Remove two mounting screws of the Master removal fan, disconnect the connector and remove the fan.



Master removal fan

8. Master Removal Section

[Adjustment]

1. Projected Position of Master Removal Hooks

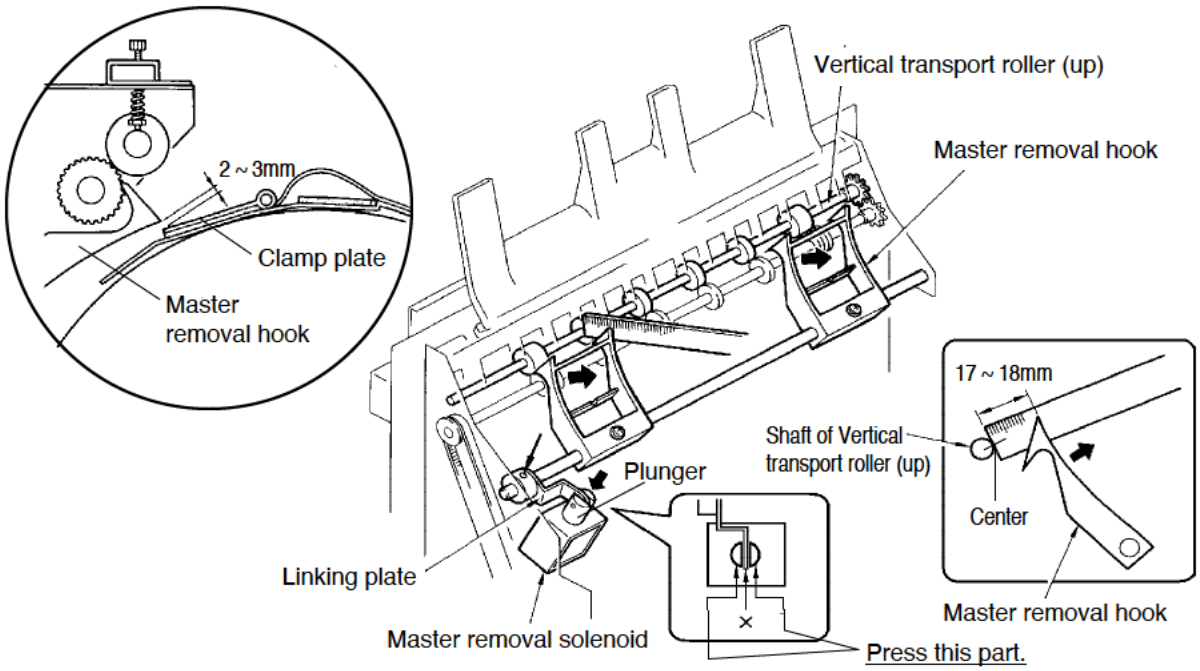
1. Pull out the Drum, open the Clamp plate and return the Drum into the machine.
2. Rotate the drum until the edge of the opened Clamp plate is positioned just below the tips of the Master removal hooks, by pressing **SW1** on the **System PCB**.
2. Start up Test mode **No.71** to project the Master removal hooks.
3. Check the tip of the projected Master removal hooks is **2 ~ 3mm** off the Clamp plate on the Drum.
4. If not, return the Drum to the home position and pull out the drum from the machine.
5. Turn OFF the power and loosen the allen screw securing the Linking plate on the Master removal hook shaft.
   [Note]
   For a finer and easier adjustment, it is advisable to remove the Master removal unit from the machine. (Refer to the page VIII-5 or VIII-6.)
6. Pressing the plunger of the Master removal solenoid, turn the Master removal hooks until the tip of the hook is **17 ~ 18 mm** off the shaft of the Vertical transport roller (up).
   Holding the Master removal hooks in this position, tighten the allen screw on the Linking plate without releasing the plunger of the Master removal solenoid.
7. Re-check the projected position of the Master removal hooks with Test mode No.71.

- Precautions In Adjustment -

- When adjusting the projected position of the Master removal hooks, make sure to press the plunger not the Linking plate.

- Results of Misadjustment -

- If the Master removal hooks are not projected enough;
  a used master will not be removed from the drum and the error code **[E 25]** be displayed on panel.
- If the Master removal hooks are projected too much;
  the tip of the hooks will contact the Clamp plate, causing the hooks and/or Clamp plate to be deformed. In the worst case, the Clamp plate will be caught between the Vertical transport rollers, causing the drum to be stuck in rotation, which will result in the error code **[E 01]** display on panel.



2. Position of Disposal Box Set Sw

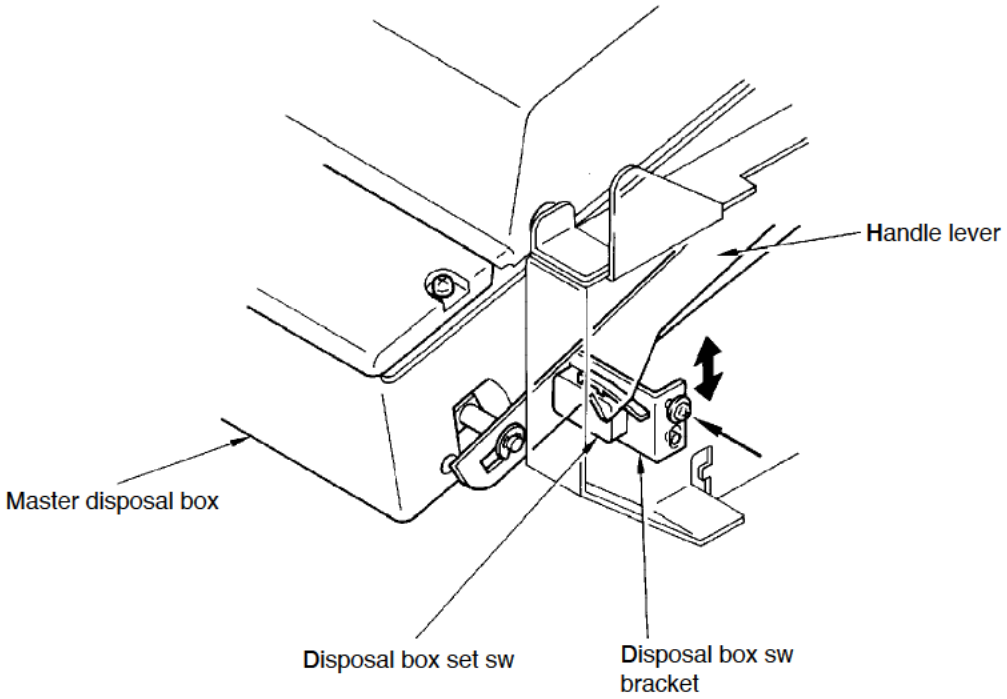
1. Check that the error code **[E 57]** is not displayed on the operation panel when the Master disposal box is securely put in the Master removal unit and it is displayed when the handles of the box are gripped.
2. If the above conditions are not satisfied, turn OFF the power and remove the Master removal unit. (Refer to the page VIII-5 or VIII-6.)
3. Loosen the mounting screw of the Disposal box sw bracket and adjust the position of the Disposal box set sw.

- Precautions In Adjustment -

- If the lower handle of the Master disposal box doesn't move smoothly, the Disposal box set sw may not be actuated ON even when it is correctly positioned.
  Before adjustment, therefore, always confirm that the handle moves smoothly.

- Results of MIsadjustment -

- If the Disposal box set sw is not correctly positioned;
  the error code **[E 57]** willbe displayed on the operation panel even when the Master disposal box is installed in the Master removal unit.

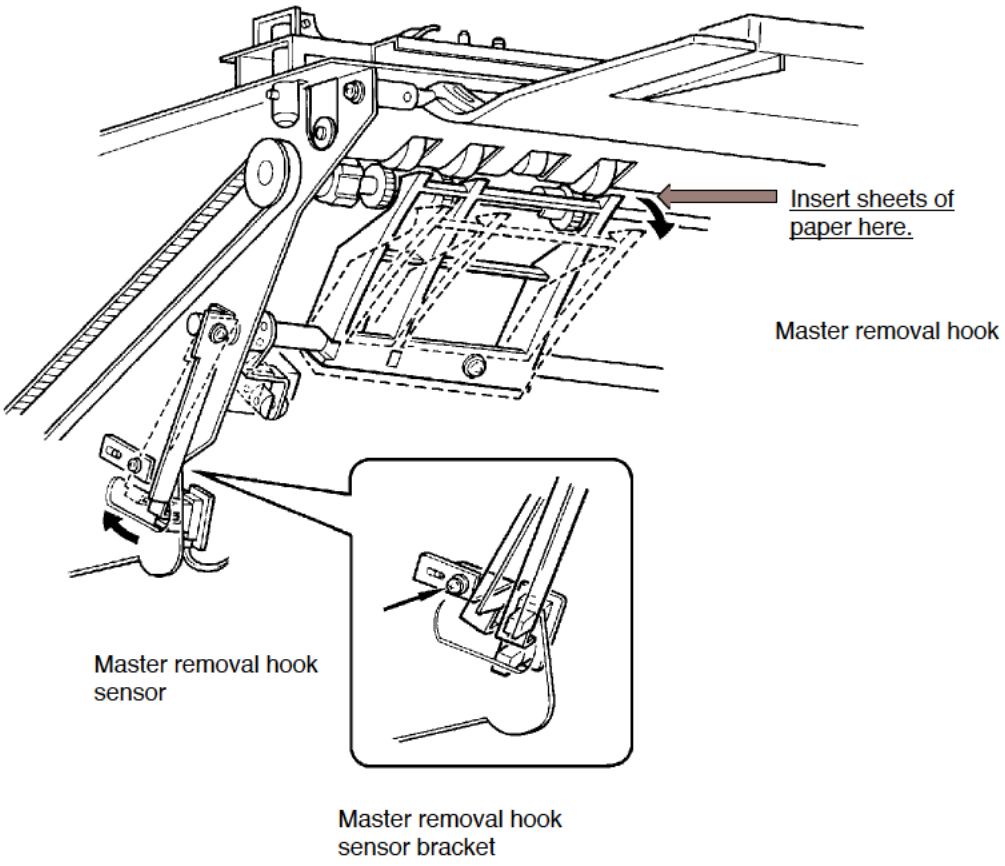


3. Position of Master Removal Hook Sensor

1. Turn ON the power and confirm that the error message "REMOVE JAMMED MASTER IN DISPOSAL UNIT" or [E 26] is not displayed on the operation panel.
2. Open the Scanner table (or the Upper cover) and force both the Scanner table set sw (or the Upper cover set sw) and the Main motor interlock sw to be actuated.
   Insert several sheets of paper into between the Master removal hooks and the M.-remv. vertical transport roller without blocking the light path of the Master removal sensor.
3. Check if the error message "REMOVE JAMMED MASTER IN DISPOSAL UNIT" or [E 26] is displayed under this condition.
4. If not, turn OFF the power and remove the Master removal unit. (Refer to the pages VIII-12-GR36 & VIII-12-GR37.)
5. Loosen the mounting screw of the Master removal hook sensor bracket and adjust the position of the Master removal hook sensor by moving the bracket.

- Results of MIsadjustment -

- If the Master removal hook sensor is out of position;
  the error message "REMOVE JAMMED MASTER IN DISPOSAL UNIT" or [E 26] will be displayed without any masters jammed at the entrance of the Master removal unit.



9. Master Clamp & Loading Sections

[Theory of Operation]

1. Master Clamping System * Timing chart is on the page IX-4.

- Basic
When a used master is removed from the drum, a new-made master proceeds to the drum and its top part is caught by the Clamp plate.

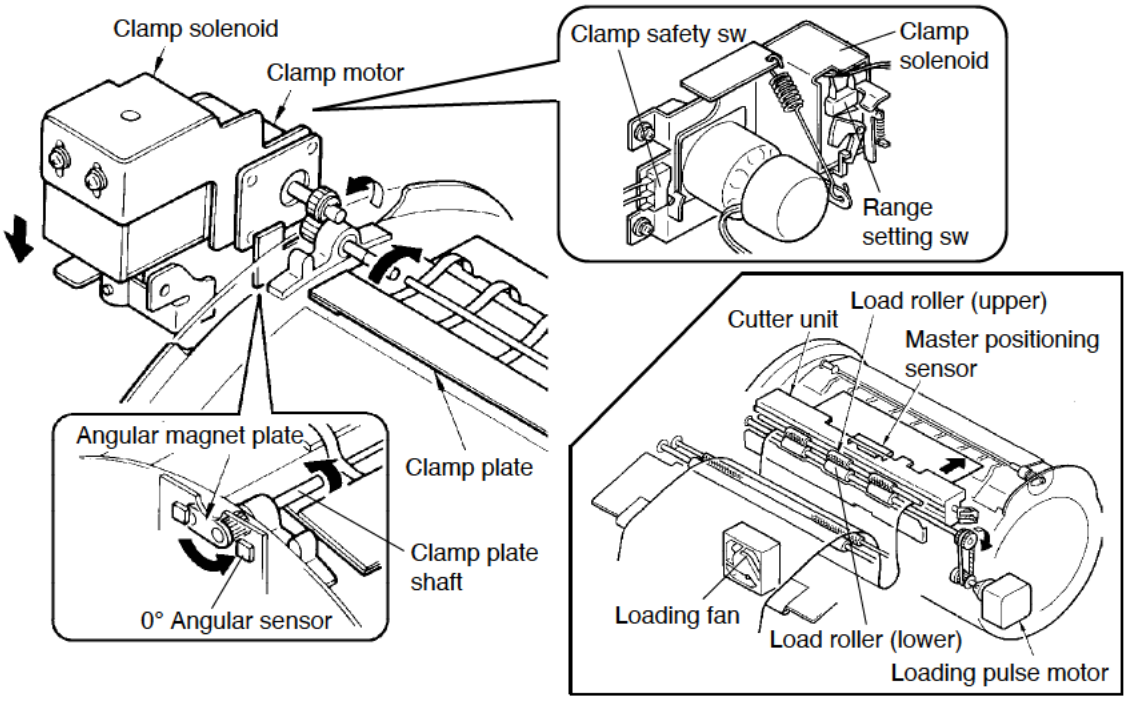
- Preoperations for Master Clamping
The following steps are already completed before closing the Clamp plate.
1. The Main motor stops and the Drum is at the home position.
2. It is confirmed that the light path of the Master removal sensor is open (a removed master has entered the Master disposal box). **100 msec later**, the Clamp solenoid is activated, lowering the Clamp unit to the Drum, by which the gear on the Clamp motor is engaged with that of the Clamp plate.
3. The Clamp safety switch is released at the same time, causing the Loading pulse motor to start rotating, by which the Load rollers are rotated to feed a new-made master to the Drum.
4. **317 pulses later**, the Loading pulse motor stops to finish master feeding to the Drum.

- Closing of Clamp Plate
When the Loading pulse motor stops, the Clamp motor starts to rotate the Clamp motor gear, causing the Clamp plate to close on the top part of the fed master.

- Return of Clamp Unit
When the 0° Angular sensor detects magnetism of the Angular magnet on the Angular magnet plate attached to the end of the Clamp plate shaft, it is assumed that the Clamp plate has been closed and the Clamp motor and Clamp solenoid are simultaneously deactivated.

- Finish of Master Clamping
When the Clamp solenoid is deactivated, the Clamp unit is returned to the initial (retreat) position and presses the actuator of the Clamp safety switch, by which it is confirmed that the new-made master is now ready to be loaded on the Drum with its top part secured by the Clamp plate.

- Protection of Clamp Solenoid
When the Clamp solenoid is energized, the Range setting switch is actuated ON to reduce the current flowing through the solenoid for protecting it against overheat.



2. Master On-Drum Loading System * Timing chart is on the page IX-5.

- Basic

When the top part of a new-made master has been caught by the Clamp plate, the Drum starts rotating to load the master on the Drum.

- Start of Master On-Drum Loading

After the Clamp plate operation is completed, the Original IN sensor status is checked to ensure that the scanning of an original is close to the end.

When it is confirmed that the trail edge of an original has passed through the Original IN sensor (that the light path of the Original IN sensor is opened), or the Read and Write start signal is turned off (in case the Write pulse motor has been rotated for the preset pulses before an original passes through the Original IN sensor), the Main motor and Print signal are turned on, causing the Drum to rotate and paper to start feeding.

- Function of Loading Fan

At the same time the Main motor is turned on, the Loading fan starts to suck air and attracts the master waiting in the Master stocker to secure correct master loading on the Drum.

- Check of Master On-Drum Loading Error [Position C-1]

As the Drum rotates and the Plate C-1 is detected by the Position C sensor, the Master loading sensor is activated to check the master status on the Drum to determine if a master (on-drum) loading error has occurred.

- Master Cutting & Lowering of Thermal Print Head [Position C-2]

As the Drum rotates further and the Plate C-2 is detected by the Position C sensor, the Cutter motor is activated to cut the master with the Rotary cutter and simultaneously the Thermal pressure motor rotates until the TPH pressure switch is depressed to apply pressure on master material.

- Check of Master Cutting Error [Home Position A]

As the Drum rotates further and the Plate A is detected by the Position A sensor, the Master positioning sensor is activated to determine if a master cutting error has occurred.

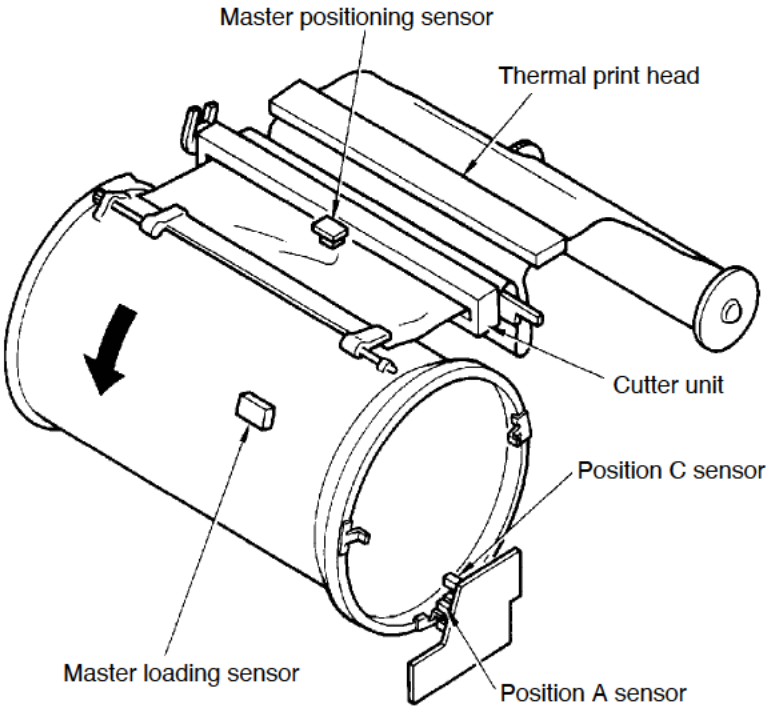
If master material is detected by the Master positioning sensor at this position, it is assumed that a master cutting error has occurred.

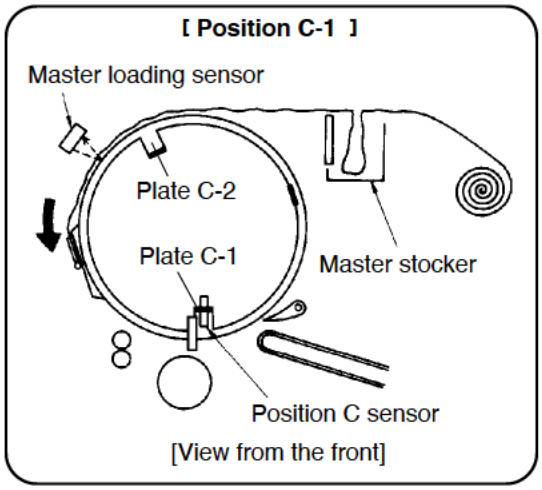
- Advance of Master for Next Master-Making

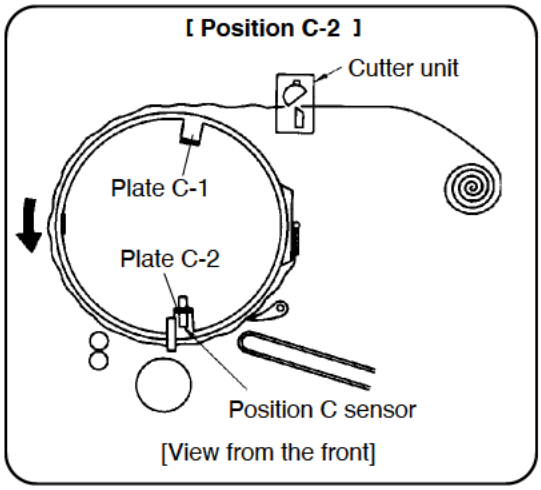
If it is determined that no master cutting error has occurred, the Write and Loading pulse motors rotate to advance master material into position for the next master-making operation.

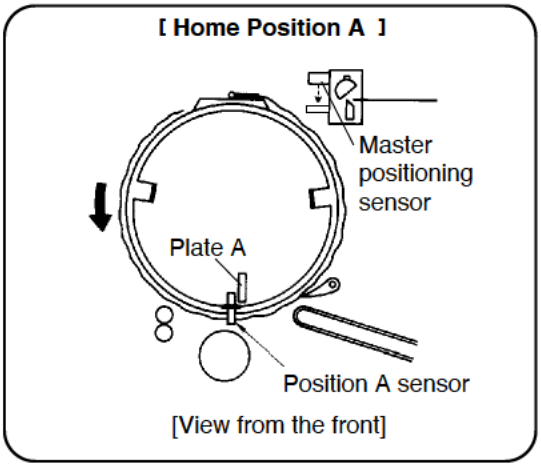
The new-made master is closely loaded on the Drum, feeding a sheet of paper.

(No paper feeds in the confidential operation.)


Master positioning sensor
Thermal print head
Cutter unit
Position C sensor
Master loading sensor
Position A sensor

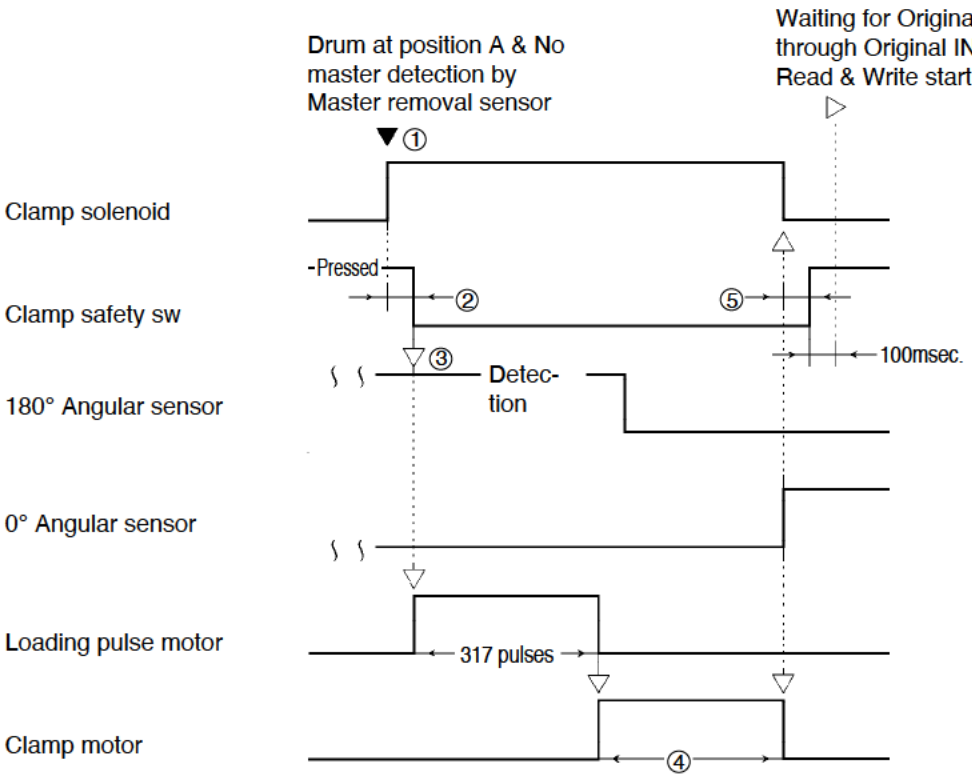

[Position C-1]
Master loading sensor
Plate C-2
Plate C-1
Master stocker
Position C sensor
[View from the front]


[Position C-2]
Cutter unit
Plate C-1
Plate C-2
Position C sensor
[View from the front]


[Home Position A]
Master positioning sensor
Plate A
Position A sensor
[View from the front]

- Timing Chart -

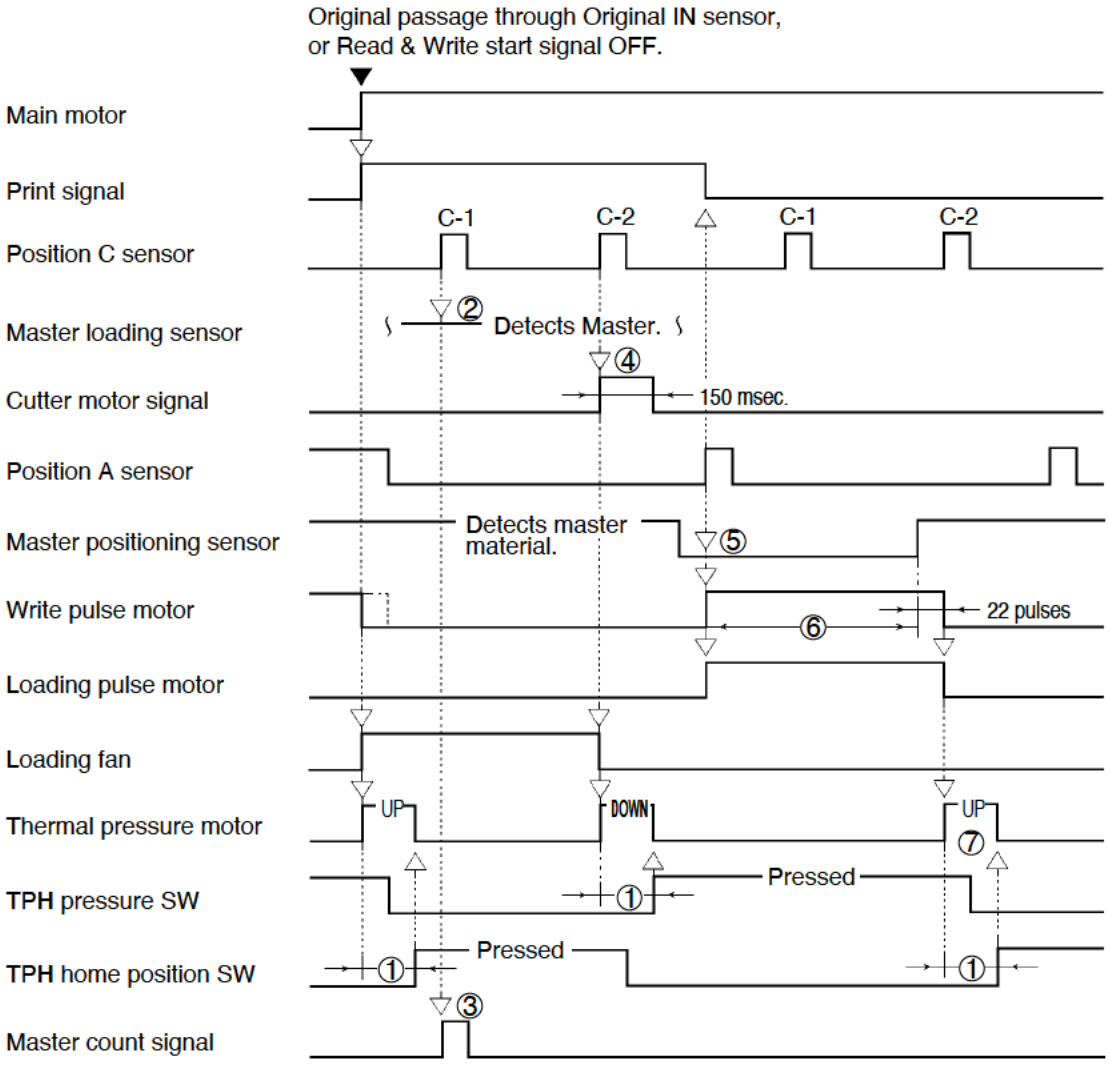
Master Clamping System



① During Master removal operation, if a removed Master is still detected by the Master removal sensor when the Drum returns to Position A, the Clamp solenoid is not activated until the removed Master clears through the sensor completely.
② If the Clamp safety switch has not been released **within 4 seconds** after the Clamp solenoid is activated, the solenoid is deactivated and the Drum is rotated again and stops at Position A. The solenoid is reactivated after the Drum stops at Position A, and if the Clamp safety sw remains actuated **for 4 seconds**, the machine assumes a **Clamp error-1** has occurred and displays the error code **[E 03]**.
③ If the 180° Angular sensor does not detect a magnet, the Clamp motor operates until the magnet is detected, after which the Loading pulse motor is activated.
④ If the 0° Angular sensor has not detected a magnet **within 8 seconds** after the Clamp motor is activated, the machine assumes a **Clamp error-1** has occurred and displays the error code **[E 03].**
⑤ If the Clamp safety switch has not been pressed **within 4 seconds** after the Clamp solenoid is deactivated, the machine assumes a **Clamp error-1** has occurred and displays the error code **[E 03].**

-Timing Chart -

Master On-Drum Loading System



① If the TPH home position Sw or TPH pressure SW has not been pressed **within 4 seconds** after the Therma presure motor is activated, the machine assumes a **Thermal pressure motor lock** has occurred and displays the error code **[E 19]**.
② If the Master loading sensor does not detect master on the Drum, the machine assumes a **Master loading error** has occurred and displays the error code **[E 21]**.
③ If the Master loading sensor detects master on the Drum, the Master count signal is output to increase the Total master counter by 1.
④ When the Cutter motor signal is output, the Cutter motor is activated.
The motor stops when the Cutter position switch is released.
⑤ If the Master positioning sensor detects master material, the machine assumes a **Master cutting error** has occurred and proceeds to a recovering action.
⑥ If the Master positioning sensor has not detected master material **within 787-pulse** turns of the Write pulse motor after the Write pulse motor and Loading pulse motor are activated, the machine assumes a **Master misfeed** has occurred and displays the error code **[E 22]**.
⑦ The Thermal print head is not raised if another original is set on the Original feed table.

3. Master Post-Cutting Feeding System

- Basic

When the Drum rotates to the Home position A after master cutting in master loading operation and it is confirmed that the Master positioning sensor detects no master (no reflected light), that is, no master cut error has occurred, the Write pulse motor and Loading pulse motor are activated to feed master material until the Master positioning sensor detects the master material.

- Function of Read Pulse Motor

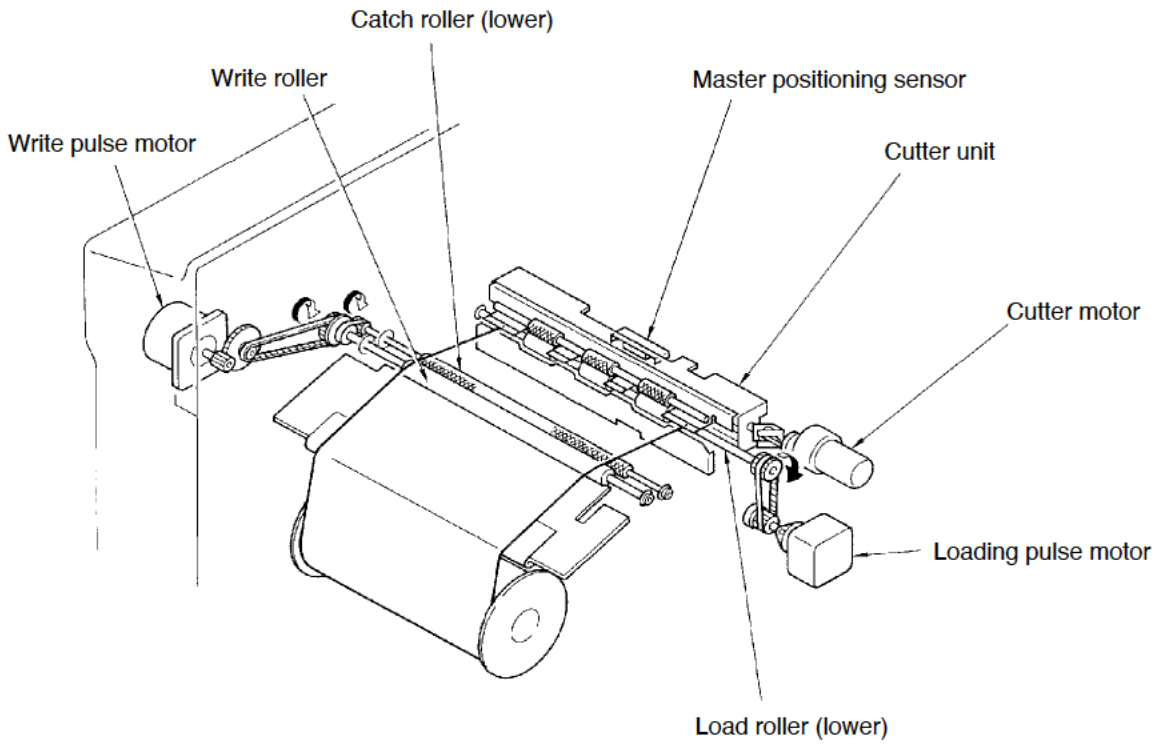
When the Read pulse motor is activated, the Write roller and Catch roller (lower) are rotated via pulleys and belts and start to feed master material.
The Catch roller (upper) is rotated, driven by the Catch roller (lower).

- Function of Loading Pulse Motor

The Loading pulse motor drives the Load roller (lower) via pulleys and a belt, and feed the oncoming master material further with the Load roller (upper), which is driven by the Load roller lower).

- Finish of Post-Cutting Feeding

As the leading edge of master material is detected by the Master positioning sensor, the Write pulse motor and Loading pulse motor are deactivated **22 pulses** later.
At the same time they are deactivated, the Thermal pressure motor is activated to raise the Thermal print head until the TPH home postion switch is actuated ON.



4. Master Cutting System

- Basic

The Cutter operates in the following cases.

- When the Drum is rotated to the Position C-2 during loading master on the Drum.
- When the Master positioning sensor detects master material at the time the Master loading unit is opened and closed.
- When the Master loading button is pressed with master material already loaded.

- Function of Cutter Motor

The Cutter joint B is rotated by the Cutter joint A, which is attached to the Cutter motor shaft and joined to the Cutter joint B with an into-slit-inserted pin.

The rotation of the Cutter joint B is transmitted to the upper Cutter blade, which is rotated against the stationary lower Cutter blade, cutting master material.

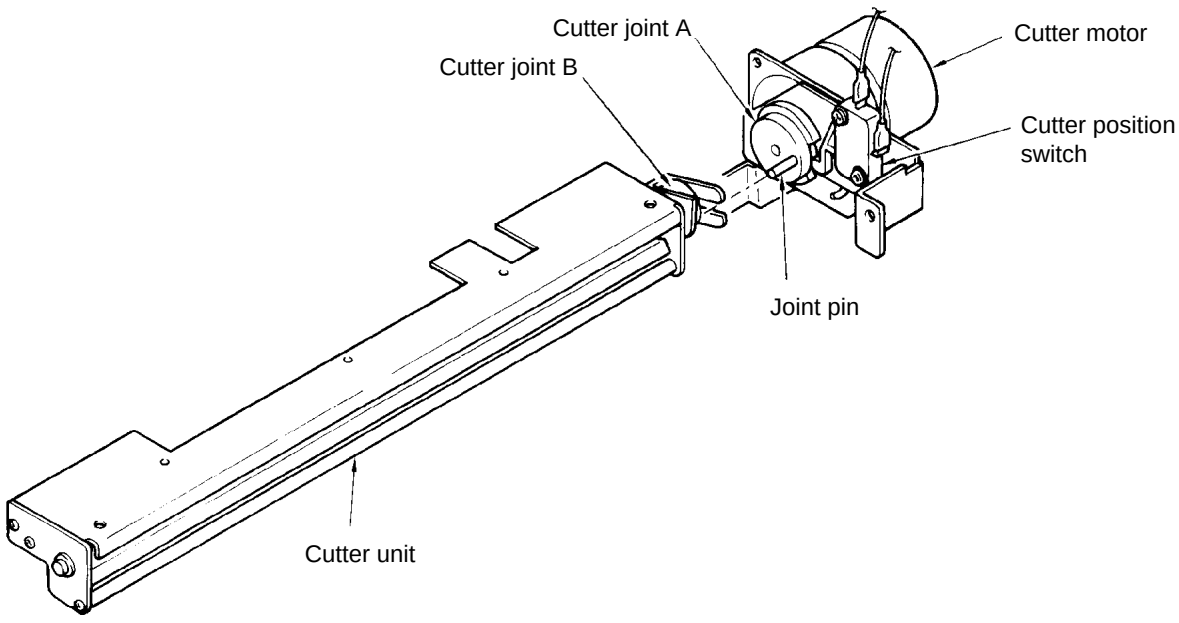
- Function of Cutter Position Switch

During the rotation of the Cutter motor, the Cutter position switch is pressed ON and OFF by the cam on the Cutter joint A.

As the Cutter motor starts to rotate, the actuator of the switch is pressed by the high part of the cam and the motor keeps rotating while the actuator of the switch is pressed.

The motor is deactivated when the actuator of the switch is released by the groove on the cam a the end of one turn of the cam.

Thus the upper Cutter blade makes one turn and stops.



5. Master Setting System

- Basic

When master material is unrolled below the Master loading unit (under green films), the Master loading unit is closed on it and the Master loading unit switch is thus pressed, 0.5 seconds later, the status of the Master positioning sensor is checked to see whether the sensor detects master material.

If no master material is detected, the master setting movement **(1)** described below starts.

If master material is detected, the master setting movement **(2)** described below starts.

- Master setting movement (1)

0.5 seconds after the Master loading unit switch is pressed, the Thermal pressure motor is activated to lower the Thermal print head until the actuator of the TPH pressure switch is pressed.

As the TPH pressure switch is pressed, the Write pulse motor and Loading pulse motor are activated to transfer master material towards the Master positioning sensor.

The Write pulse motor and Loading pulse motor stop to end the master feeding movement **22 pulses** after the Master positioning sensor detects the leading edge of the master.

At the same time the motors stop, the Thermal pressure motor is activated to raise the Thermal print head until the actuator of the TPH home position switch is pressed and the master setting movement (1) is completed.

- Master setting movement (2)

0.5 seconds after the Master loading unit switch is pressed, the Thermal pressure motor is activated to lower the Thermal print head until the actuator of the TPH pressure switch is pressed.

As the TPH pressure switch is pressed, the Write pulse motor and Loading pulse motor are activated to feed master material.

55 6 pulses later, the motors stop and the Cutter motor is activated, cutting the master material.

The machine panel indicates to remove a cut strip of master.

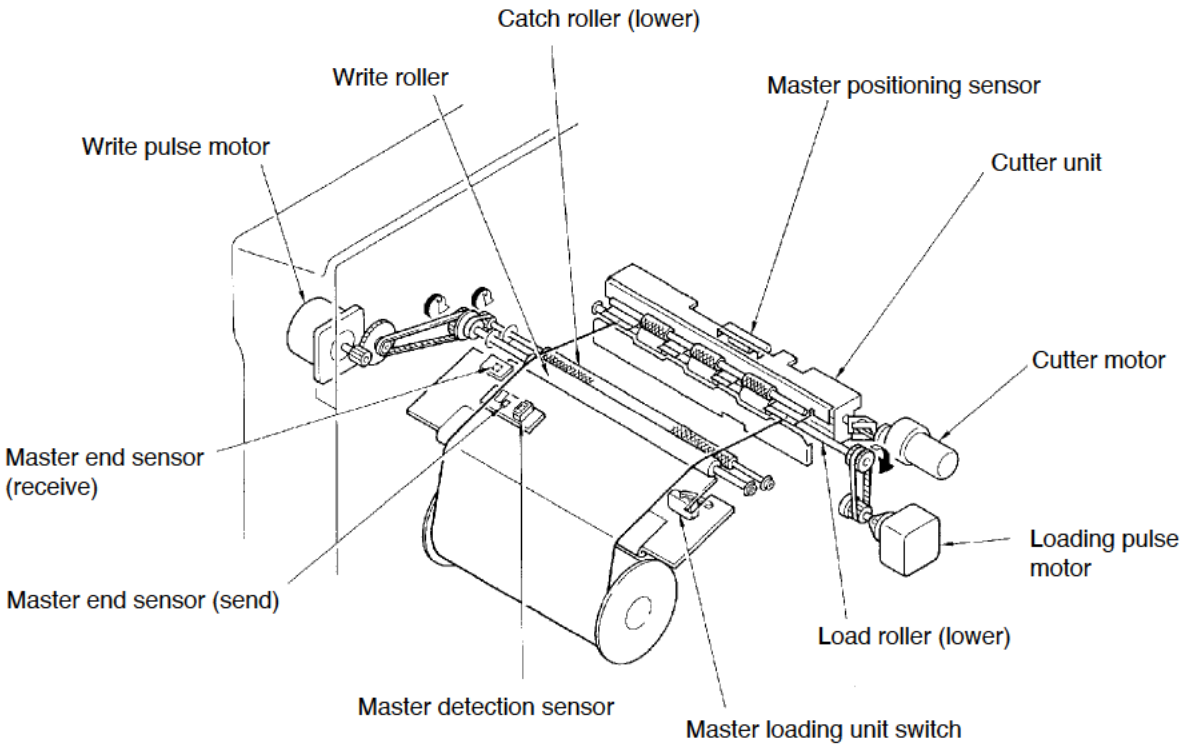
When the cut strip of master is removed as indicated on the panel and no master is thus detected by the Master positioning sensor, 0.5 seconds later, the Write pulse motor and Loading pulse motor restart to feed master material, towards the Master positioning sensor.

The Write pulse motor and Loading pulse motor stop to end the master feeding movement **22 pulses** after the Master positioning sensor detects the leading edge of the master.

At the same time the motors stop, the Thermal pressure motor is activated to raise the Thermal print head until the actuator of the TPH home position switch is pressed and the master setting movement (2) is completed.

- Status Check of Master Roll

The Master detection sensor checks whether or not master material is correctly set under the Master loading unit, and the Master end sensor detects the end of a roll of master, i.e. black tape.

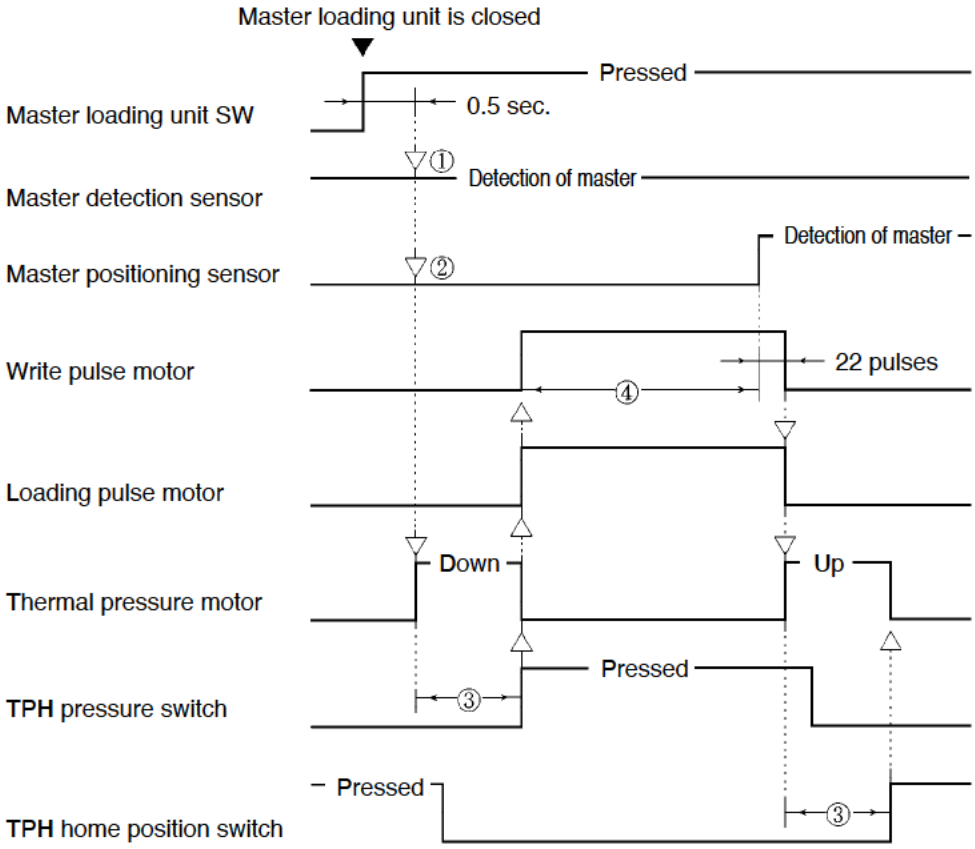


- When the Master detection sensor detects no master material (no reflected light), the machine assumes that a roll of master is not correctly set in the machine and indicates the error code **[E 54]** .
- If the light path of the Master end sensor is blocked, i.e. the black tape is detected, the machine assumes a roll of master has been consumed and indicates the message "**Replace master roll**" on the operation panel.
- If the Master loading unit switch is not pressed, the machine assumes the Master laoding unit is not closed and indicates the error code **[E 58]**.

5. Master Setting System
~ Master Setting Movement (1)
- Timing Chart -

- Timing Chart -

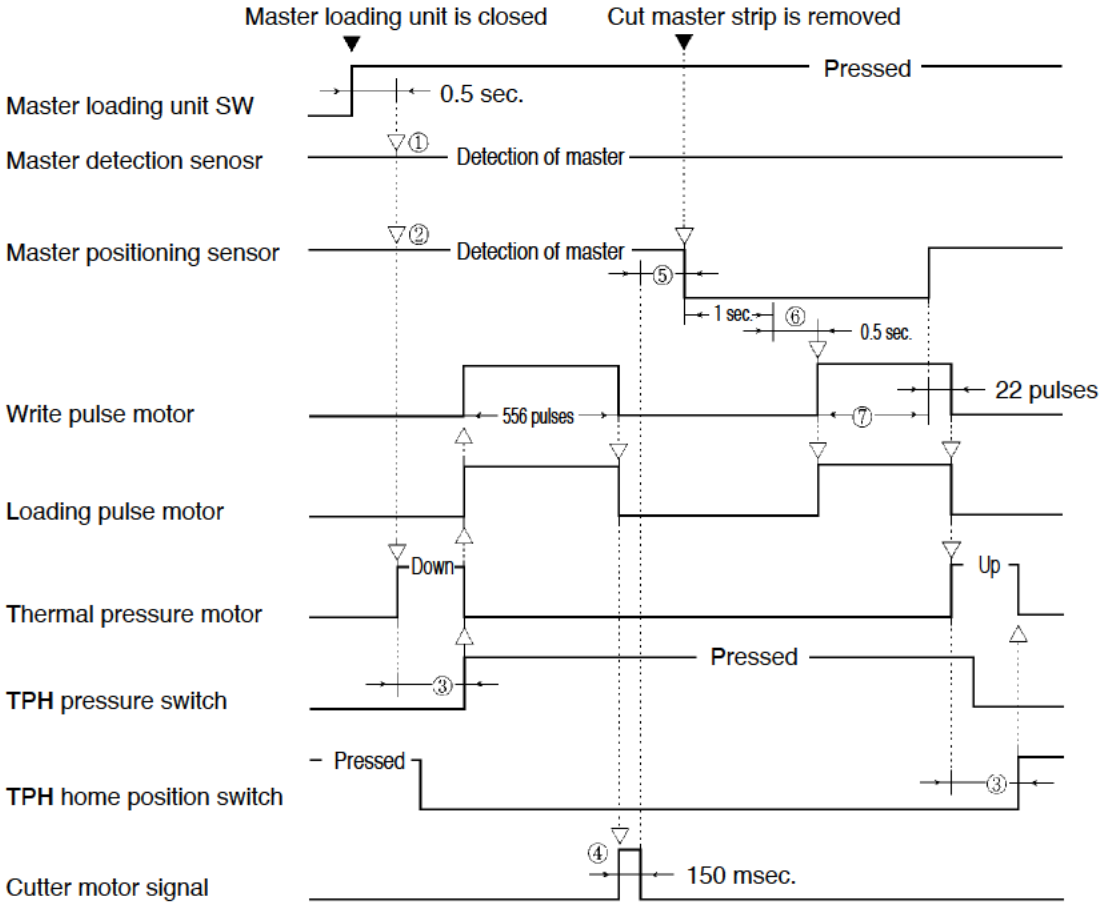
Master Setting Movement (1)



① The status of the Master detection sensor is checked to confirm the presence of master material.
② The status of the Master positioning sensor is checked to determine the next operation, i.e. Master setting movement (1) or (2), **0.5 seconds** after the Master loading unit is closed.
③ If the actuator of either the TPH pressure switch or TPH home position switch has not been pressed within **4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has locked and indicates the error code **[E 19]**.
④ If the Master positioning sensor has not detected master material **within 1260 pulses** after both the Write pulse motor and Loading pulse motor are activated, the machine assumes that master mis-feed has occurred and indicates the error code **[E 22]**.

- Timing Chart -

Master Setting Movement (2)



① The status of the Master detection sensor is checked to confirm the presence of master material.
② The status of the Master positioning sensor is checked to determine the next operation, i.e. the Master setting movement (2), **0.5 seconds** after the Master loading unit is closed.
③ If the actuator of either the TPH pressure switch or TPH home position switch has not been pressed **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has locked and indicates the error code **[E 19]**.
④ The Cutter motor is deactivated after the Cutter motor signal is kept output for **150 msec**. and the actuator of the Cutter position switch is released OFF.
⑤ If the Master positioning sensor detects master material after the Cutter motor is activated, the machine assumes a cut strip of master remains inside the machine and indicates the error code **[E 24]**.
⑥ If the Master positioning sensor keeps unchanged in the status of "no detection of master" for **1 second**, the machine assumes that the cut master strip has been removed and, **0.5 second** later, the Write pulse motor and Loading pulse motor start to rotate.
⑦ If the Master positioning sensor has not detected master material **within 787 pulses** after both the Write pulse motor and Loading pulse motor are reactivated, the machine assumes that master mis-feed has occurred and indicates the error code **[E 22]**.

6. Master Free Feeding System

- Basic

The Master loading button starts the following operations whenever the machine is idle: master feeding, cutting and post-cutting feeding.

- Master Feeding

When the Master loading button is pressed, the Thermal pressure motor is activated to lower the Thermal print head until the actuator of the TPH pressure switch is pressed, and then the Write pulse motor and Loading pulse motor are activated to feed master material.

If the Master positioning sensor detects master when the Master loading button is pressed, as in normal cases, the Write pulse motor and Loading pulse motor stop **566 pulses** later.

If not, however, they stop 566 pulses after the Master positioning sensor detects master.

- Master Cutting

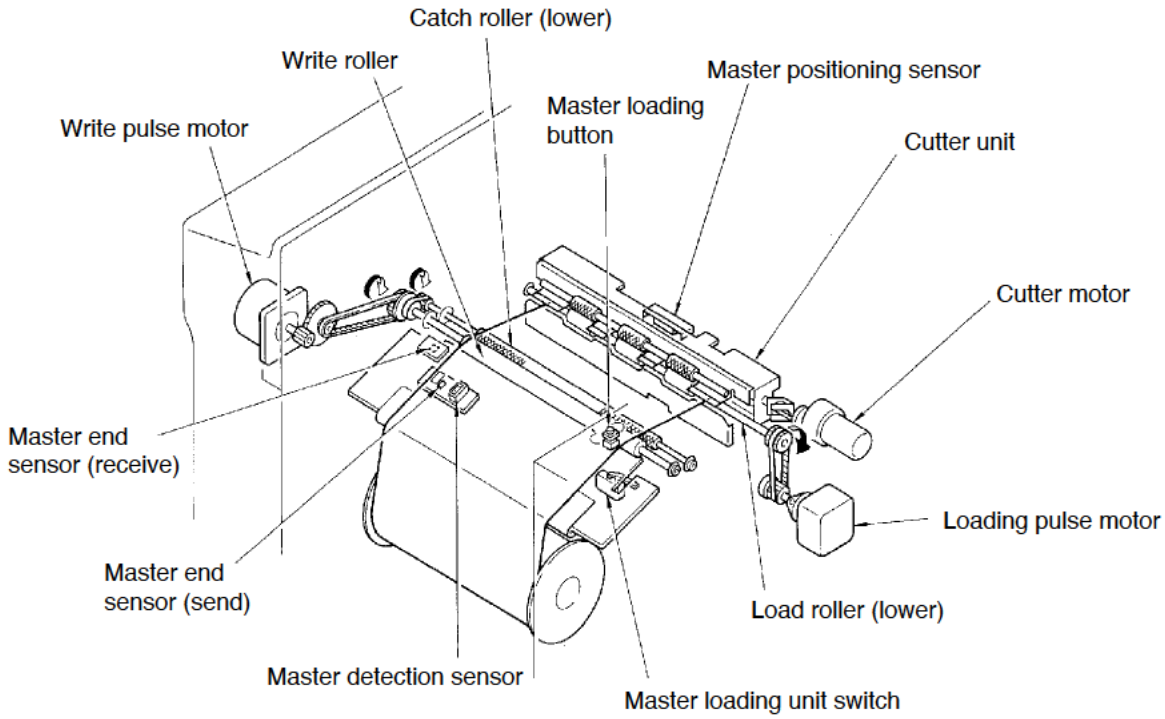
At the same time the motors stop, the Cutter motor is activated to cut the master material.

- Master Post-Cutting Feeding

When a cut strip of master is removed from the machine and the Master positioning sensor keeps unchanged in the status of "no detection of master" for 1 second, the machine assumes that the cut strip of master has been removed and, 0.5 second later, the Write pulse motor and Loading pulse motor is reactivated to feed the master material towards the Master positioning sensor.

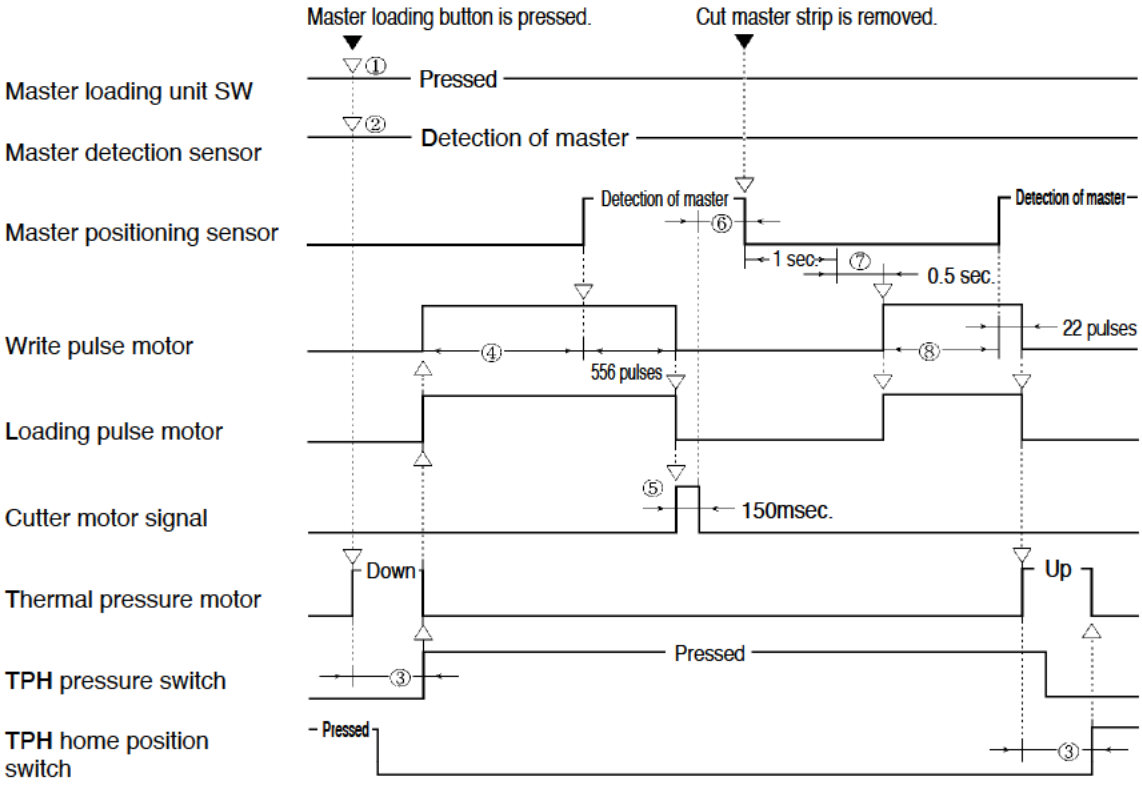
As the Master positioning sensor detects the leading edge of the master material, the Write pulse motor counts **22 pulses** and then both the Write pulse motor and Loading pulse motor stop.

At the same time the motors stop, the Thermal pressure motor is activated to raise the Thermal print head unitl the TPH home position switch is pressed.



- Timing Chart -

Master Free Feeding System



① The status of the Master loading unit switch is checked to confirm that Master loading unit is closed.
② The status of the Master detection sensor is checked to confirm that it detects master material.
③ If the actuator of either the TPH pressure switch or TPH home position switch has not been pressed **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes that the Thermal pressure motor has locked and indicates the error code **[E 19]**.
④ If the Master positioning sensor has not detected master material **within 1260 pulses** after both the Write pulse motor and Loading pulse motor are activated, the machine assumes that master mis-feed has occurred and indicates the error code **[E 22]**.
⑤ The Cutter motor is deactivated after the Cutter motor signal is kept output for **150 msec.** and the actuator of the Cutter position switch is released OFF.
⑤ If the Master positioning sensor detects master material after the Cutter motor is activated, the machine assumes a cut strip of master remains inside the machine and indicates the error code **[E 24]**.
⑥ If the Master positioning sensor keeps unchanged in the status of "no detection of master" for **1 second**, the machine assumes that the cut master strip has been removed and, **0.5 second** later, the Write pulse motor and Loading pulse motor start to rotate.
⑦ If the Master positioning sensor has not detected master material **within 787 pulses** after both the Write pulse motor and Loading pulse motor are reactivated, the machine assumes that master mis-feed has occurred and indicates the error code **[E 22]**.

7. Post-Master-Miscut Operation

- Detection of Master Cut Error

If the Master positioning sensor detects master material at the Home position A after master cutting operation in loading a master on the Drum, the machine assumes a master cut error has occurred. (*Refer to Fig.1.*)

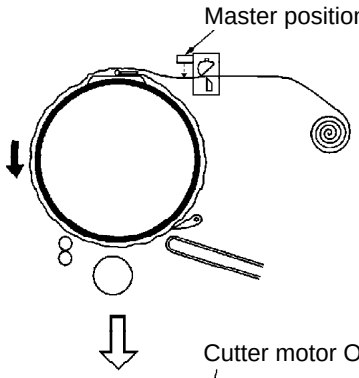
- Retrial of Master Cutting Operation

When a master cut error occurs, the Thermal pressure motor is activated to raise the Thermal print head until the TPH home position switch is pressed, and the Drum continues to rotate.
When the Drum comes to the Position C-1, the Cutter motor is reactivated. (*Refer to Fig.2.*)

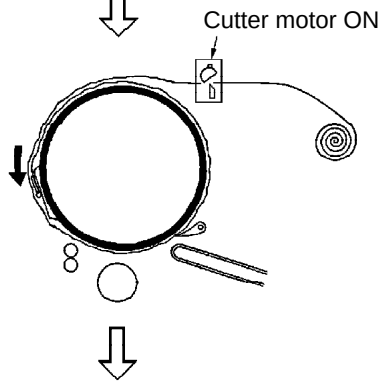
- Recheck of Master Cut Error

The Master positioning sensor checks the result of the master cutting operation again when the Drum comes to the Position C-2. (*Refer to Fig.3 & 4.*)
If the Master positioning sensor does not detect master material, the machine assumes that the master has been cut and activates the Thermal pressure motor to lower the Thermal print head until the TPH thermal pressure switch is pressed, in order to feed master material.
When the Drum returns to the Home position A, the Write pulse motor and Loading pulse motor are activated to feed the leading edge of the master material up to the Master positioning sensor.
If the Master positioning sensor detects master material, on the contrary, the machine assumes that the Cutter motor has locked and indicates the error code **[E 13]** when the Drum returns to the Home position A.

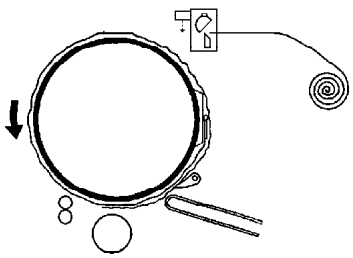
[Fig.1]



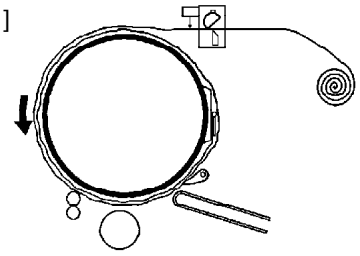
[Fig.2]



[Fig.3]

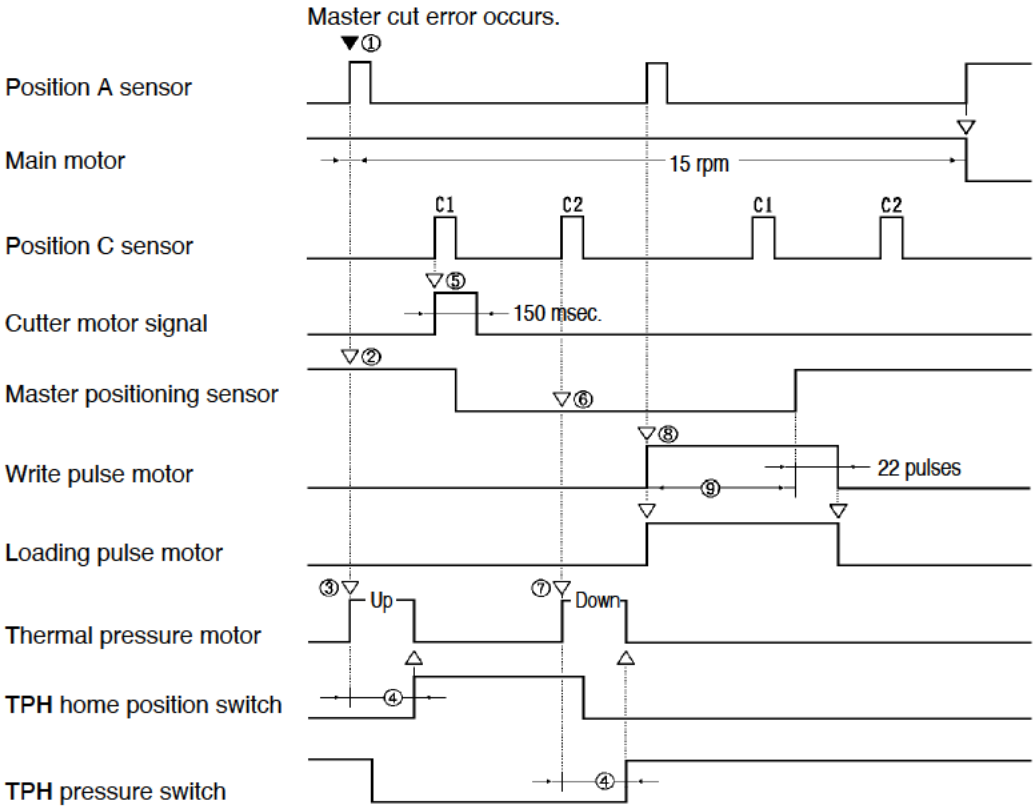


[Fig.4]



- Timing Chart -

Post-Master-Miscut Operation



① The first Home position A after master cutting operation.
② As the Master positioning sensor detects master material, the machine assumes a master cut error has occurred.
③ When a master cut error occurs, the Thermal pressure motor is activated to raise the Thermal print head until the TPH home position switch is pressed.
④ If the TPH home position switch or TPH pressure switch has not been pressed **within 4 seconds** after the Thermal pressure motor is activated, the machine assumes the Thermal pressure motor has locked and displays the error code **[E 19]**.
⑤ The Cutter motor is reactivated when the Drum comes to the Position C-1 again.
⑥ When the Drum reaches the Position C-2, if the Master positioning sensor detects master material, the machine assumes that the Cutter motor has locked and displays the error code **[E 13]**.
If the Master positioning sensor detects no master material, however, the machine assumes that the master has been cut at the second time and continues to feed master material until its leading edge passes under the Master positioining sensor. On the operation panel, on the other hand, the error code **[E 23]** is displayed because there was a master cut error at the first time.
⑦ When the master is cut, the Thermal print head is lowered to feed master material towards the Master positioning sensor.
⑧ Post-cutting feeding of mater material in the case the master is cut.
⑨ If the Master positioning sensor has not detected the leading edge of master material **within 787 pulses** after the Write pulse motor and Loading pulse motor start, the machine assumes the master mis-feed has occurred and indicates the error code **[E 22]**.

9. Master Clamp & Loading Sections

[Removal and Assembly]

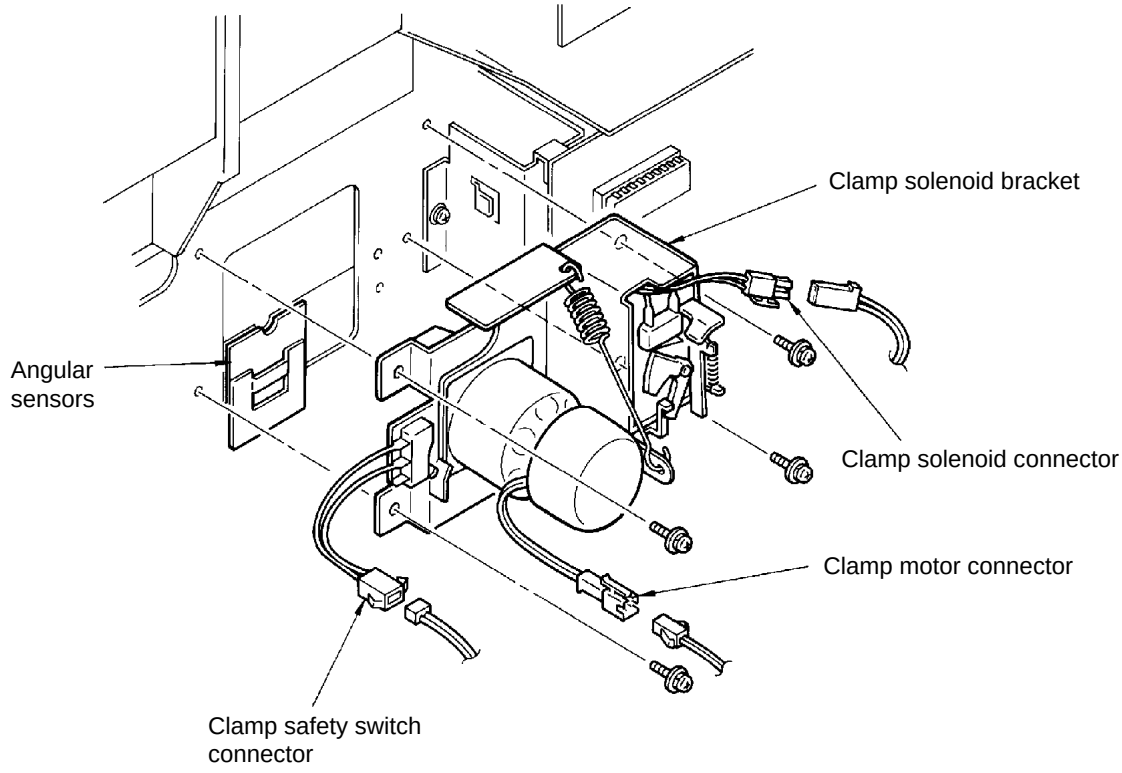
1. Clamp Unit

< Removal Procedure >

1. Turn OFF the power and remove the Back cover.
2. Disconnect the connectors of the wires coming out of the Clamp unit, i.e. Clamp solenoid, Clamp motor and Clamp safety switch.
3. Remove four mounting screws on the Clamp unit and remove the unit from the machine.

- Precautions in Assembly -

- M4x6 double-washer screws should be used in mounting the Clamp unit onto the machine. If longer screws are used, the screws will get contact with the Drum and interfere with the Drum rotation.



2. Clamp Motor
3. Clamp Solenoid

2. Clamp Motor

< Removal Procedure >

1. Remove the Clamp unit, referring to the previous page.
2. Remove four mounting screws of the Clamp motor and remove the motor from the Clamp unit.

- Precautions in Assembly -

- Put grease lightly on the Drive gear of the Clamp motor.
- Put locking bond on the mounting screws of the Calmp motor after attaching the motor back on the Clamp unit.

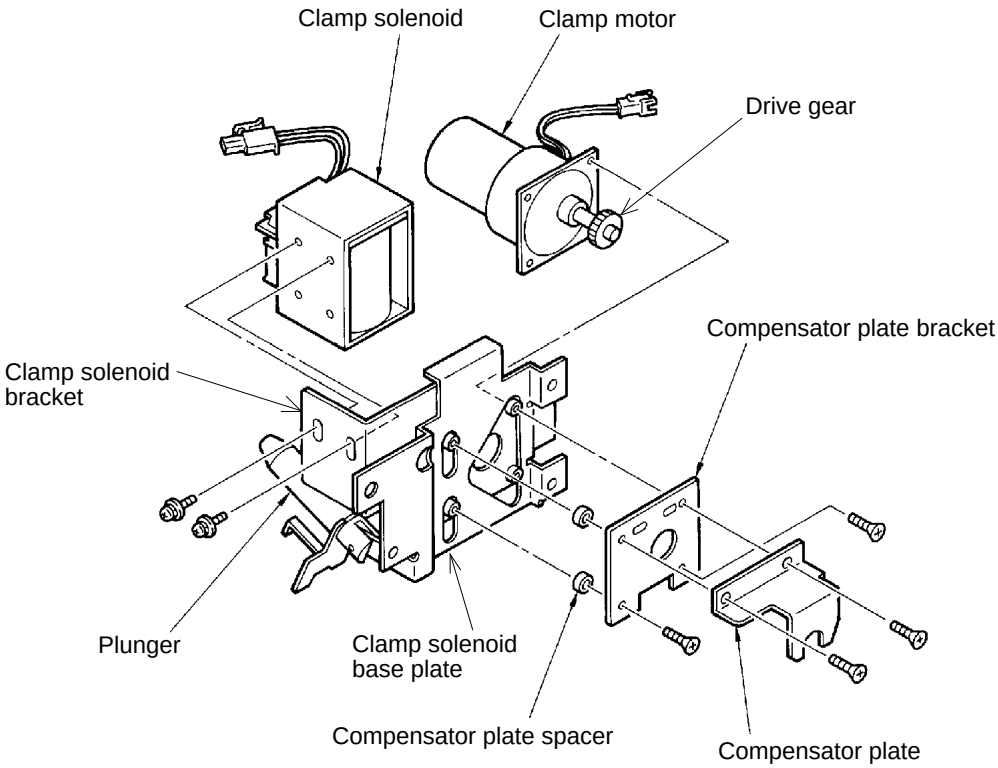
3. Clamp Solenoid

< Removal Procedure >

1. Remove the Clamp unit, referring to the previous page.
2. Remove two mounting screws of the Clamp solenoid and remove the solenoid from the Clamp unit, separating it from the Plunger.

- Precautions in Assembly -

- Put grease lightly on the sliding surface between the Clamp solenoid base plate and Clamp solenoid bracket.



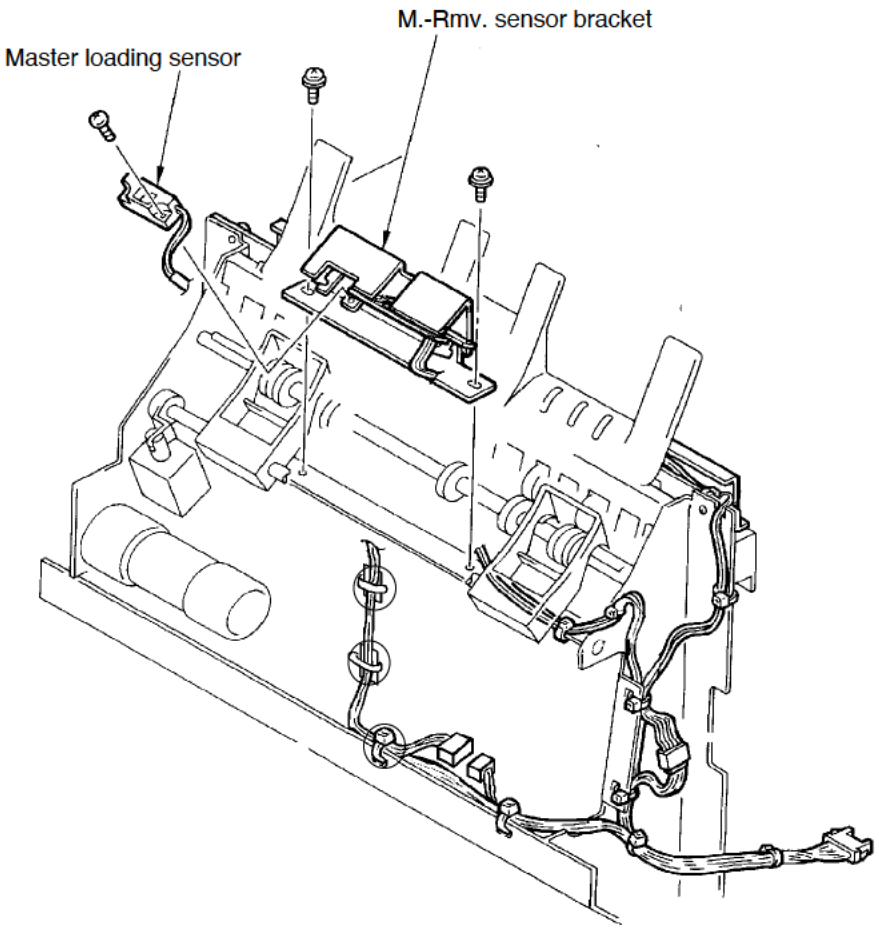
4. Master Loading Sensor

< Removal Procedure >

1. Remove the Master removal unit, referring to the page VIII-5 or VIII-6.
2. Remove the mounting screw on the Master loading sensor and separate the sensor from the M.-Rmv. sensor bracket.
3. Disconnect the connector of the Master loading sensor and cut the wire clampers securing the wires of the sensor to the Master removal unit frame.
   Remove the sensor from the Master removal unit.

- Precautions In Assembly -

- Make sure to secure the wires of the sensor with wire clampers as before removal.



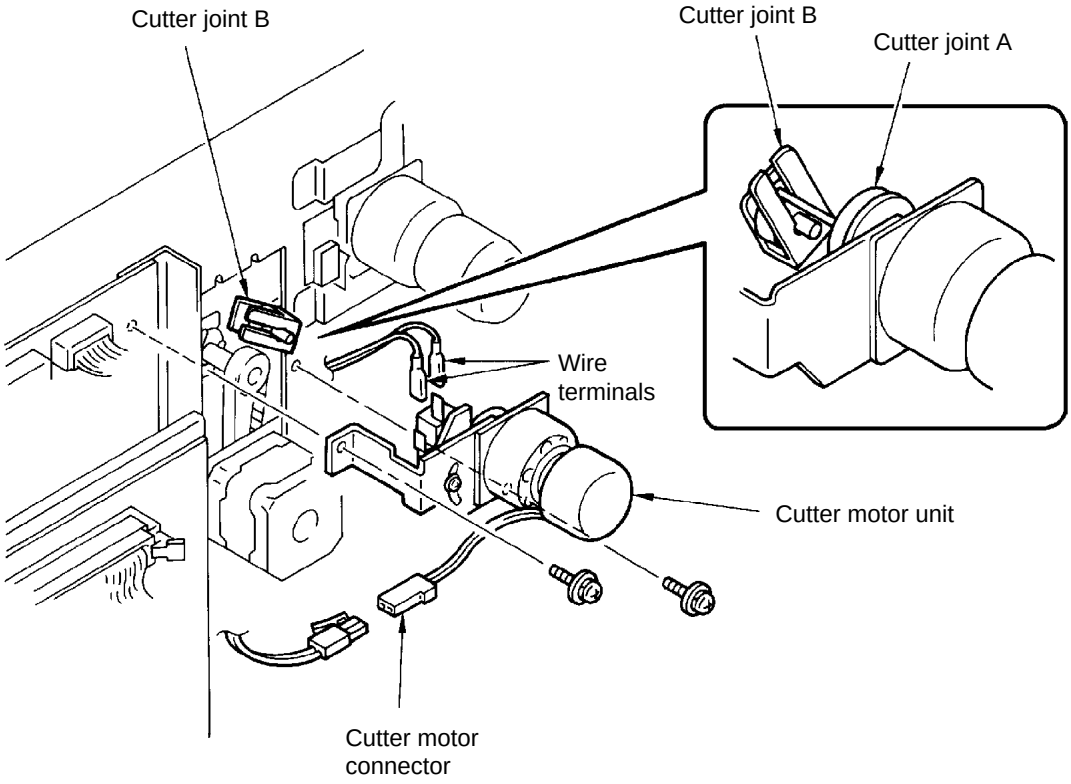
5. Cutter Motor Unit

< Removal Procedure >

1. Turn OFF the power and remove the Back cover.
2. Disconnect the connector of the Cutter motor.
3. Remove two mounting screws on the Cutter motor unit, unplug two wire terminals from the Cutter position switch and remove the Cutter motor unit.

- Precautions in Assembly -

- Make sure to insert the joint pin of the Cutter joint A into the slit of the Cutter joint B.



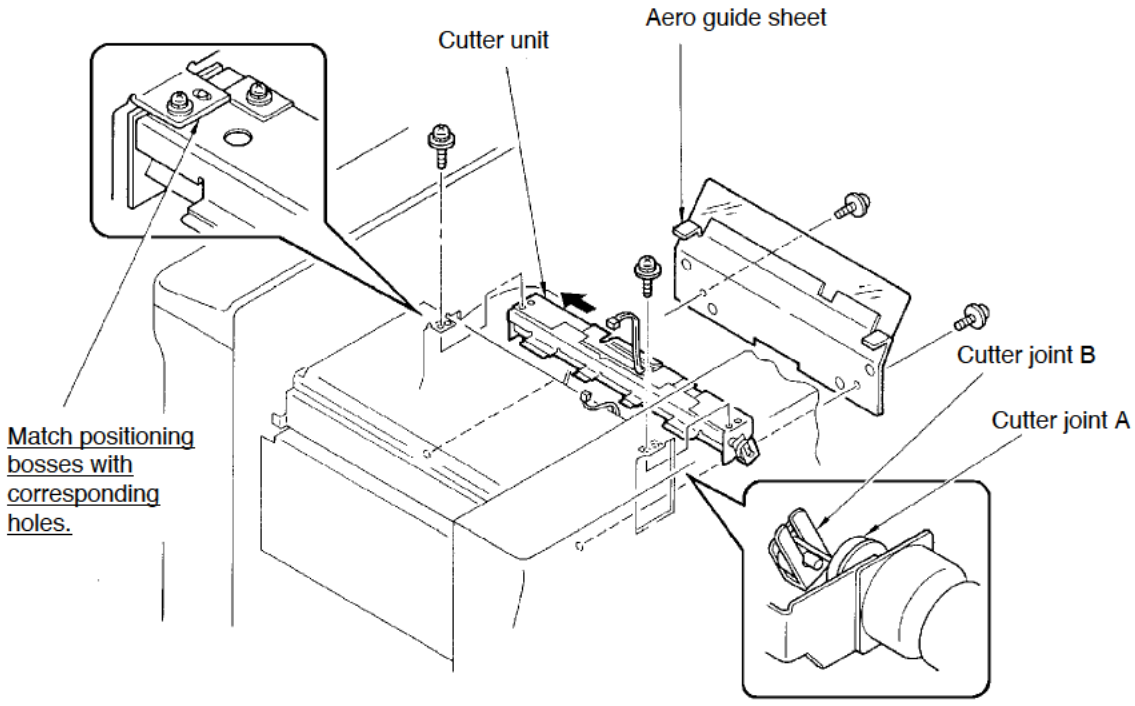
6. Cutter Unit

< Removal Procedure >

1. Pull out the Drum, turn OFF the power and remove the Back cover.
2. Remove the Upper cover (only in RA4200 & 4900).
3. Remove two mounting screws on the Aero guide sheet and remove the sheet.
4. Disconnect the connector from the Master positioning sensor.
5. Remove two mounting screws of the Cutter unit and take out the unit from the opening for the Drum replacement, holding it from underneath.

- Precautions In Assembly -

- Do not bend or damage the green films, i.e. Set sheets A and B.
- Be sure to use M4x6 double-washer screws when securing the Cutter unit.
  If longer screws are used, they get contact with the upper Cutter blade and lock it.
- When mounting the Cutter unit back in the machine, make sure to match the respective positioning bosses on the Cutter unit with the corresponding holes of the mounting brackets. Otherwise, master wrinkles will occur in loading a master on the Drum.
- Make sure to insert the joint pin of the Cutter joint A into the slit of the Cutter joint B.
- After installing the Cutter unit, make sure that the upper Cutter blade moves smoothly with Test mode **No.112**, before setting master.



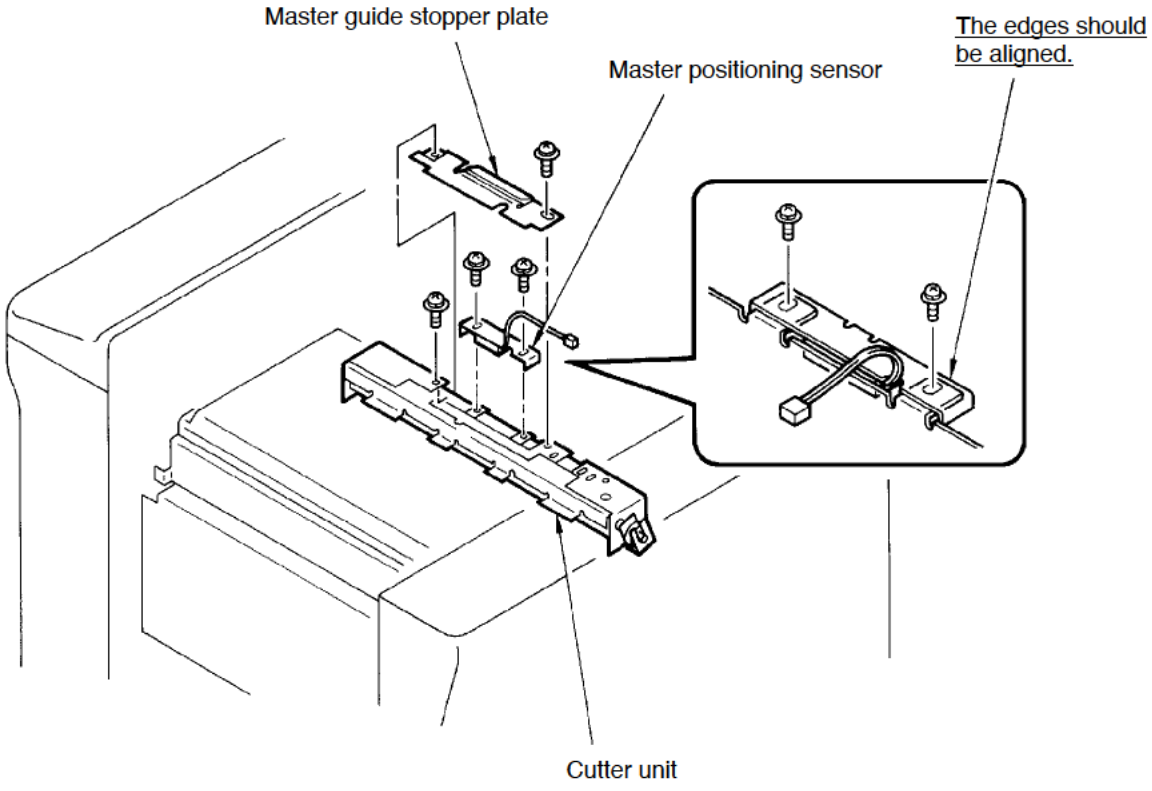
7. Master Positioning Sensor

< Removal Procedure >

1. Turn OFF the power and open the Upper cover (or Scanner table).
2. Disconnect the connector of the Master positioning sensor.
3. Remove two mounting screws on the Master guide stopper plate and remove the plate.
4. Remove two mounting screws on the Master positioning sensor and remove the sensor.

- Precautions In Assembly -

- Align the side edge of the Master positioning sensor with the front edges of the mounting plates on the Cutter unit.
  If the mounting position of the Master positioning sensor is changed, the length of master which is to be caught by the Clamp plate will be changed accordingly.



8. Master End/Det. Sensors Ass'y

< Removal Procedure >

1. Turn OFF the power, and open the Upper cover (or the Scanner table) and Master loading unit.
2. Remove two mounting screws on the Set guide plate and set aside the plate.
   [Note]
   In RA5900, the Stopper plate (lower) should be removed to remove the mounting screw of the Set guide plate on the rear side of the machine.
3. Disconnect the connector of the Master end/det. sensors ass'y and take out the Set guide plate from the machine.
   [Note]
   Secure the wires of the counterpart connector with a tape before disconnection to prevent the counterpart connector from slipping into the inside.
4. Remove two mounting screws on the sensors ass'y and separate it from the Set guide plate.

- Precautions In Assembly -

- Make sure to match the holes on both sides of the Set guide plate with the bosses on the brackets when securing the plate.

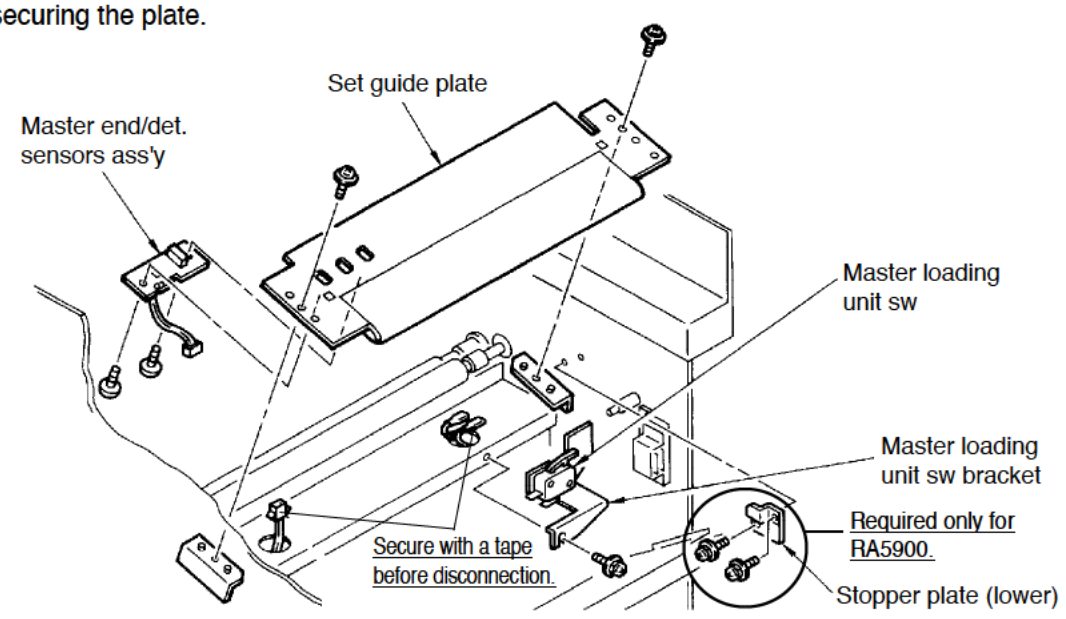
9. Master Loading Unit Sw

< Removal Procedure >

1. Remove and set aside the Set guide plate, referring to the procedures in the steps 1 & 2 above.
2. Remove the mounting screw on the Master loading unit switch bracket, and remove the bracket with the switch attached.
3. Disconnect the wires from the terminals of the Master loading unit sw.
   [Note]
   Secure the wires with a tape before disconnection to prevent them from slipping into the inside.
4. Remove two mounting screws on the switch and separate the switch from the bracket.

- Precautions In Assembly -

- Make sure to match the holes on both sides of the Set guide plate with the bosses on the brackets when securing the plate.



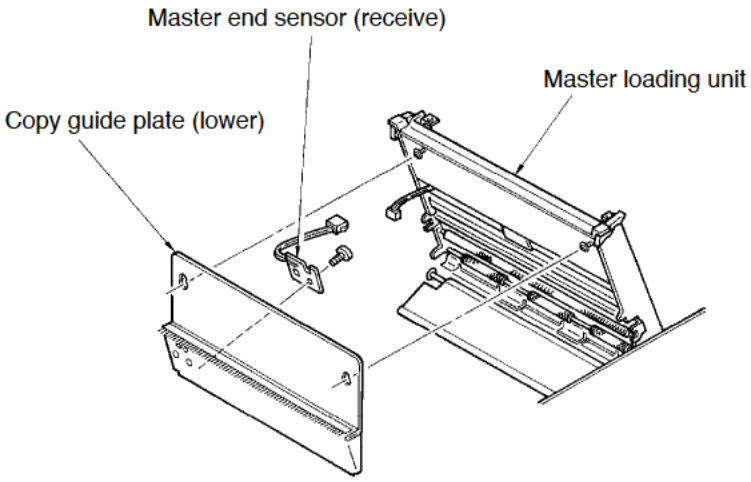
10. Master End Sensor (Receive)

< Removal Procedure >

1. Turn OFF the power and open the Upper cover (or the Scanner table).
2. Open the Master loading unit and loosen two mounting screws on the Copy guide plate (lower).
3. Remove the plate and disconnect the connector of the Master end sensor (rcv.), holding the plate.
4. Remove the mounting screw on the Master end sensor (receive) and separate the sensor from the Copy guide plate (lower).

- Precautions In Assembly -

- Be careful not to catch the wires of the sensor by the Copy guide plate (lower).



11. Loading Fan

< Removal Procedure >

Refer to the figures on pages III-14 and III-15 for this removal procedure.

1. Turn OFF the power and open the Upper cover (or the Scanner table) and then the Master loading unit.
2. Remove the mounting screw on the Master holder cover set plate, and remove the plate. Pull down the Master roll holder cover and remove it.
3. Remove four mounting screws on the the Master roll holder unit, and remove the unit.
4. Cut the wire clamper holding the wires of the Loading fan and disconnect its connector.
5. Remove two mounting screws on the Stocker plate A, and remove the plate with the Loading fan attached.
6. Remove two mounting screws on the Loading fan and separate the Loading fan from the Stocker plate A.

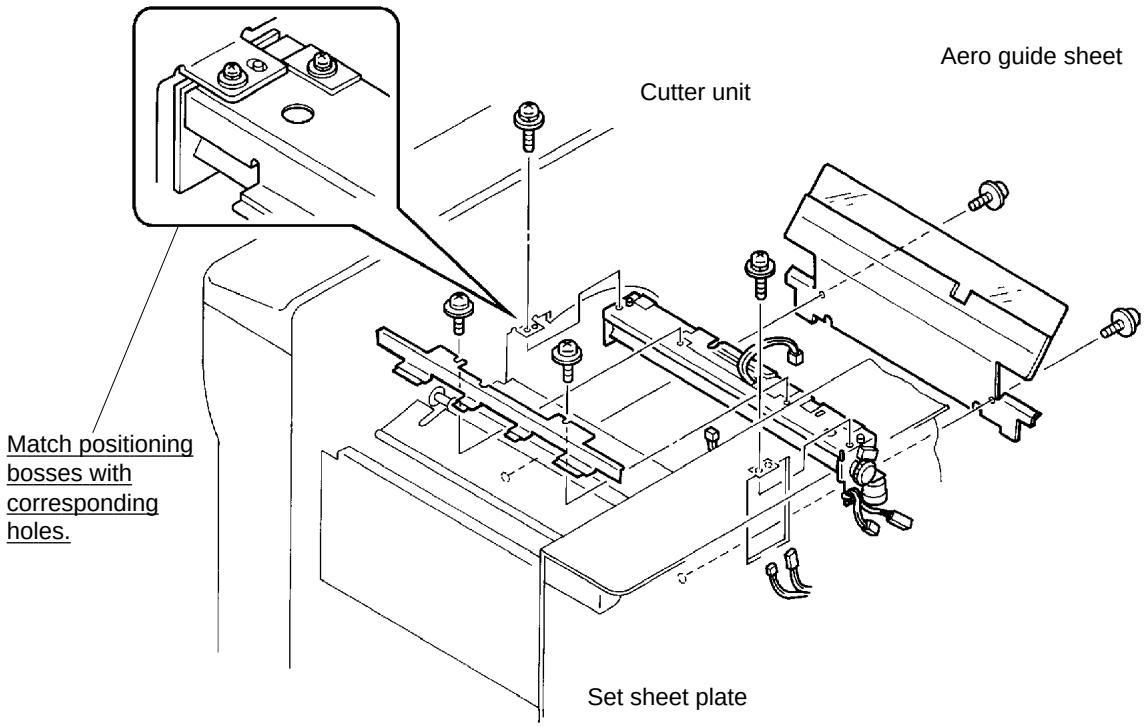
12. Cutter Unit <GR>

< Removal Procedure >

1. Pull out the Drum, turn OFF the power and remove the Back cover.
2. Open the Scanner table. (Remove the Upper cover in GR1750 and 1700).
3. Remove two mounting screws on the Aero guide sheet and remove the sheet.
4. Remove two mounting screws on the Set sheet plate and remove the plate.
5. Disconnect the connector of the Master positioning sensor.
6. Disconnect the connectors of the Cutter motor and Cutter position switch.
7. Remove two mounting screws of the Cutter unit and take out the unit from the opening for the Drum replacement, holding it from underneath.

- Precautions in Assembly -

- Do not bend or damage the green films, i.e. Set sheets A and B.
- Be sure to use M4x6 double-washer screws when securing the Cutter unit.
  If longer screws are used, they get contact with the upper Cutter blade and lock it.
- When mounting the Cutter unit back in the machine, make sure to match the respective positioning bosses on the Cutter unit with the corresponding holes of the mounting brackets. Otherwise, master wrinkles will occur in loading a master on the Drum.
- After installing the Cutter unit, make sure that the upper Cutter blade moves smoothly with Test mode **No.112**, before setting master.



13. Loading Fan <GR3750>
14. Loading Fan <GR2750/2710/1750/1700>

13. Loading Fan <GR3750>

< Removal Procedure >

Refer to the figures on the pages III-14 and III-16-GR16 for this removal procedure.

1. Turn OFF the power and open the Upper cover (or the Scanner table) and then the Master loading unit.
2. Remove the mounting screw on the Master holder cover set plate, and remove the plate. Pull down the Master roll holder cover and remove it.
3. Remove four mounting screws on the the Master roll holder unit, and remove the unit.
4. Cut the wire clampers holding the wires of other sensors and fans on the Stocker ass'y and disconnect the connector of the Loading fan.
5. Remove two mounting screws of the Stocker ass'y and remove the ass'y with the Loading fan attached.
6. Remove two mounting screws on the Loading fan and separate the Loading fan from the Stocker ass'y.

14. Loading Fan <GR2750/2710/1750/1700>

< Removal Procedure >

Refer to the figures on the pages III-14 and III-16-GR17 for this removal procedure.

1. Turn OFF the power and open the Upper cover (or the Scanner table) and then the Master loading unit.
2. Remove the mounting screw on the Master holder cover set plate, and remove the plate. Pull down the Master roll holder cover and remove it.
3. Remove four mounting screws on the the Master roll holder unit, and remove the unit.
4. Cut the wire clamper holding the wires of the Loading fan and disconnect its connector.
5. Remove two mounting screws on the Stocker plate A, and remove the plate with the Loading fan attached.
6. Remove two mounting screws on the Loading fan and separate the Loading fan from the Stocker plate A.

9. Master Clamp & Loading Sections

[Adjustment]

1. Cutter Blade Stop Position

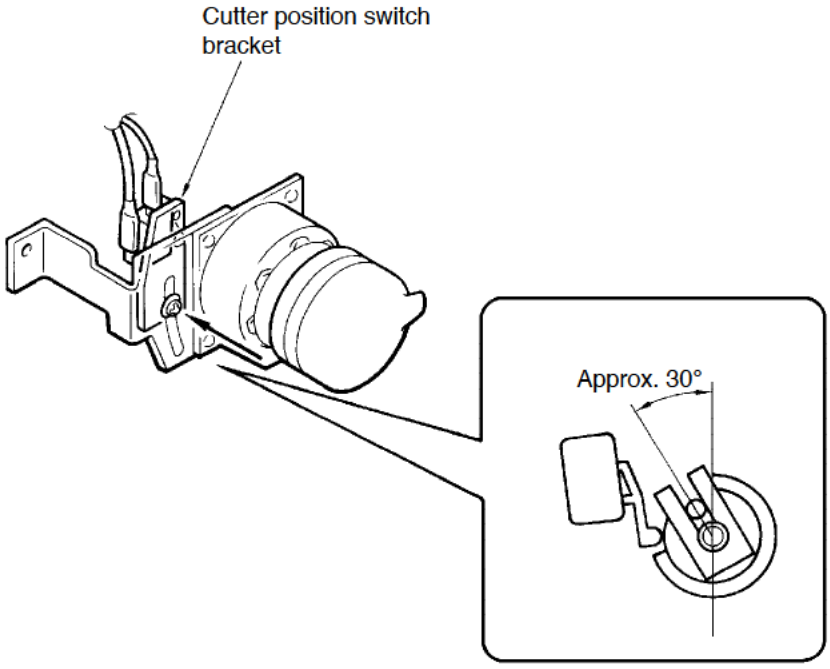
1. Turn OFF the power, and remove the Back cover.
2. Wind master material back on a master roll.
3. Activate the Cutter motor using Test mode **No.112**.
4. When the motor stops, confirm that the slit of the Cutter joint B points up approx. 30 degrees to the left off the center when inspected from the rear side of the machine, as shown on the illustration below.
5. If not, loosen the mounting screw on the Cutter position switch bracket and change the position of the switch to change the stop position of the Cutter joint B.

- Precautions In Adjustment -

- Make sure to wind master material back on the master roll before activating the Cutter motor with the Test mode.

- Result of Misadjustment -

- If the Cutter position sw is not set correctly;
  the upper Cutter blade will be off the secure home position when idle and get contact with a proceeding master, which causes wrinkles on the master when loading it on the Drum.
  In the worst case, the path of the master will be blocked and cause master mis-feed.
  As a result, the error code **[E 22]** is displayed to interrupt operation.

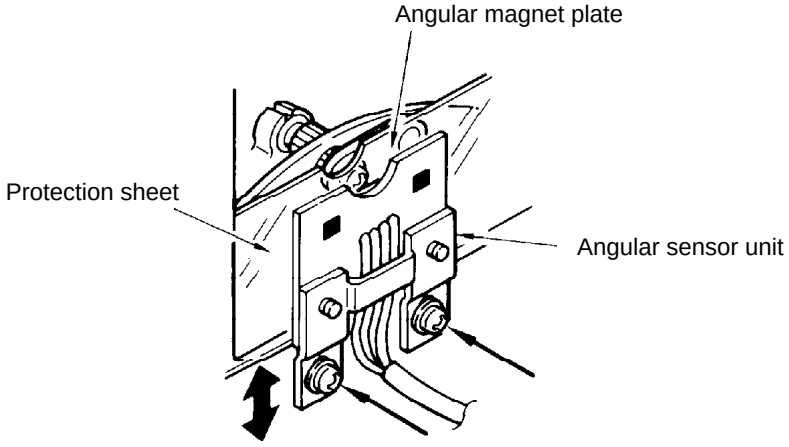


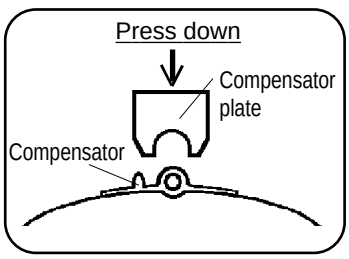
2. Position of 0°/180° Angular Sensors

1. Check if the LED **(DRM0)** is lit on the System PCB when the Clamp plate is closed and the LED **(DRM1)** is lit when it is open.
   [Note]
   Before checking LEDs, always confirm that the Compensator plate is well engaged with the Compensator by manually pushing down the Clamp uni.
   If not, adjust the position of the Angular sensor unit as described below.
2. Open and close the Clamp plate by hand and check that the Angular magnet plate and Clamp plate move smoothly and are always aligned. If not, loosen the mounting screw on the Angular magnet plate and change its position to align them.
   Close the Clamp plate and slide the Drum back into the machine.
3. Check that the Drum is at the Home position A, turn OFF the power and remove the Back cover.
4. Remove two mounting screws on the Angular sensor unit, disconnect the connector and remove the sensor.
5. Manually push down the Clamp unit until the Compensator plate is engaged with the Compensator and release the unit slowly.
   Remove the Clamp unit, referring to the page IX-17.
6. Mark the positions of the 0° Angular magnet and the mounting screw on the Angular magnet plate, on the transparent Protection sheet with a felt marker.
7. Turn ON the power and pull out the Drum from the machine.
   Open the Clamp plate and slide the Drum back into the machine.
8. Position the Drum to match the mounting screw on the Angular magnet plate with the corresponding mark on the Protection sheet and mark the position of the 180° Angular magnet on the Protection sheet with a felt marker.
9. Pull out the Drum from the machine and turn OFF the power.
   Position the Angular sensor unit to match the respective Hall ICs with the corresponding marks on the Protection sheet while inspecting from the front, and secure it with two mounting screws.
10. Connect the connector of the Angular sensors and attach the Clamp unit.
11. Turn ON the power, slide the Drum back into the machine and check LEDs on the System PCB as described in Step 1.

- Result of Misadjustment -

- If the Angular sensors are off position and can't detect the position (status) of the Clamp plate; the machine will assume that a clamp error has occurred and indicate the error code **[E 03]**.
- If magnetism is detected before the Clamp plate is completely opened;
  the Drum will start to rotate before the Clamp plate is completely opened, causing the Clamp plate stuck at the entrance of the Master removal unit.
  As a result, the Drum will be locked and the error code **[E 01]** will be indicated.





1. Paper Ejection Section
2. Drum Section
3. Master Making Section
4. ADF Image Scanning Section
5. ADF & FB Image Scanning Sections

Minor Changes from RA Series

1. Paper Ejection Section

- The positions of the Paper ejection guides are changed according to the setting of the paper feed pressure as well as the size of paper. (Refer to the pages III-3 to III-6 and the chart below.)

< Paper Ejection Guides' Arrangemant for the GR Series >

Setting	Paper Size	Feed Pressure Setting	Jump Wing SW 1	Jump Wing SW 2	Jump Wing	Belt Roller	Side Flap
1	A3 (Ledger)	CARD	OFF	OFF	Down	Down	Down
2	A3 (Ledger)	NORMAL	ON	OFF	Up	Up	Down
	A3 to A4 (Ledger to Letter)	CARD / NORMAL					
3	Less than A4 (Less than Letter)	CARD / NORMAL	OFF	ON	Up	Down	Up

* "OFF" indicates that the actuator of the switch is released and "ON" that it is pressed.
* If the sorter is connected, the setting 1 is selected regardless of the size of paper.

2. Drum Section

1. The presence of master on the Drum is checked by the **Master loading sensor** at the **Position C-1** <Cue Point 4> before *master removal* and *printing* because the Master sensor has been eliminated from GR series. (Refer to the pages IV-2 and IV-3.)
2. Three Ink bottle switches have been installed inside the Drum to prevent the use of different types of ink cartridges. (Refer to the page IV-20-GR20.)

3. Master Making Section

- The Separation fan does not operate at the beginning of master making (master removal) operation. That is, a new-made master is not pulled into the Master stocker by air suction. (Refer to the page VII-4.)

4. ADF Image Scanning Section

- On the sheet type machine (GR1750/1700), the shading sheet is attached directly on the ADF original guide (F) and fixed in position. Shading solenoid does not exist on these two machines. (Refer to the pages V-2, V-17 and V-18-GR24.)

5. ADF Image Scanning Section / Flat Bed Image Scanning Section

- The adjustable range by the image elongation and shrinkage correction using the Hex Sw on the Image processing PCB on the GR series is doubled compared to the RA series. (Refer to the pags V-22 and VI-34~35)

< Adjustable range for the GR Series >

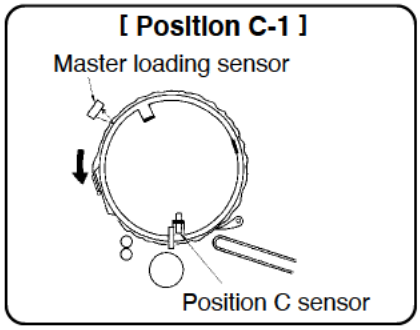
SW Setting	5	6	7	8	9	A	B	C
Adjustable Range (mm)	+6	+4	+2	±0	-2	-4	-6	-8

***** The switch should be set at between **5** ~ **C** only.

6. Master Removal Section
7. Master Clamp & Loading Sections

6. Master Removal Section

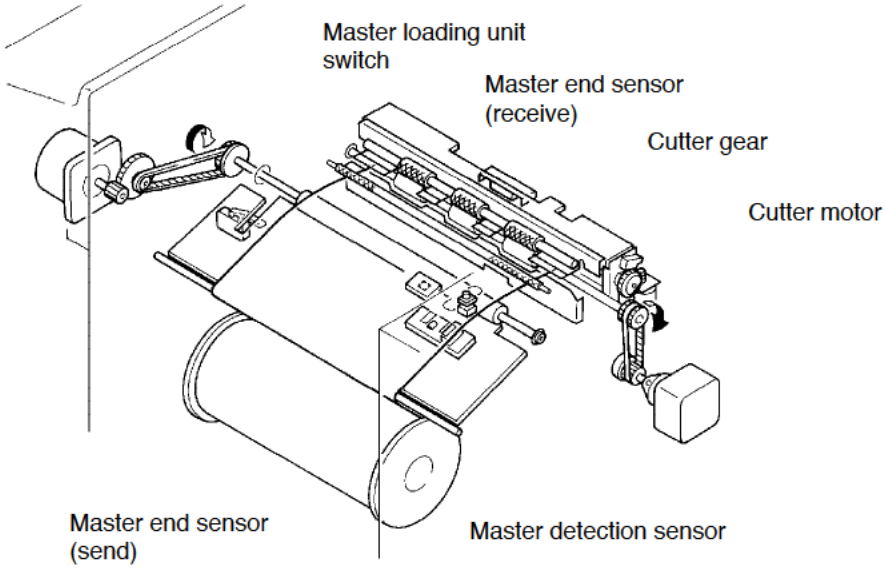
- The presence of master on the Drum is checked by the **Master loading sensor** at the **Position C-1** before *master removal* because the Master sensor has been eliminated from GR series. (Refer to the pages VIII-1.)



7. Master Clamp & Loading Sections

[GR3750]

1. The Catch rollers (upper) and (lower) are not installed. (Refer to the page IX-6 and the figure below.)
2. The Write pulse motor and Loading pulse motor stop to end the master feeding movement **54 pulses** (not 22 pulses) after the Master positioning sensor detects the leading edge of the master in the master post-cutting feeding operation and master setting operation. (Refer to the pages IX-6, IX-8 & IX-12.)



[All GR Models]

1. The locations of the following sensors and switch have been changed : the Master end sensors (receive) and (send), Master detection sensor and Master loading unit switch. (Refer to the figures above and on the page IX-9.)
2. The upper Cutter blade is rotated by the Cutter motor via the **Cutter gear** (not the Cutter joints A and B). (Refer to the figure above.)

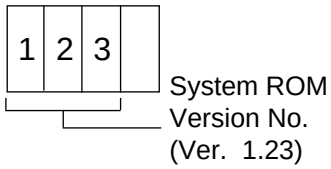
1. Test Mode

1. Operation Procedures

The Test mode program enables a service technician to check the operation of each electrical component in the machine.

1. **[Starting Up Test mode]**
   Turn on the power, pressing down both the **"LINE/PHOTO"** and **"M/P"** buttons on the main panel. If the Test mode is activated, the following indication will be displayed in the print quantity display.

   - This is a sample of the initial condition of Test mode:

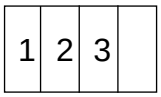
2. **[Checking the Operation of a Component]**
   To check the operation of a component, select a test No. using panel keys and then press the **"START"** button to start the test.

   The figures in the print quantity display mean:
   - The right-side two digits: The test No. selected
   - The left-side one digit: **0** for the "Test OFF" status
     1 for the "Test ON" status

   If the test is a one-cycle operation test, it will automatically stop after one check.
   If the test is a non-cycle operation test, press the **"START"** button again to stop the test.

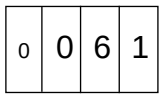
   [Print quantity display]

   [Example] - In selecting Test mode No.61

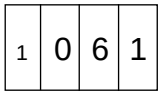
   [

   Select test No.**61** using panel keys.

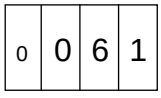
   [

   Press the **"START"** button.

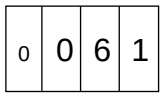
   [

   Press the **"START"** button again.

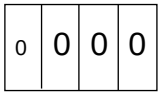
3. [Selecting Another Test mode]

To select another Test mode, clear the set Test No. by pressing the **"C"** or **"STOP"** button and select another Test No..



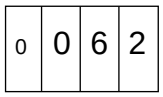
[

Clear the set Test No. by pressing **"C"** or **"STOP"** button.



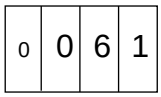
[

Select a new Test No. (Example: No.**62**)



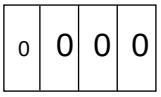
4. [Exiting from the Test mode]

To exit from a Test mode, clear the set Test No. by pressing the **"C"** or **"STOP"** button and then press the **"ALL RESET"** button.



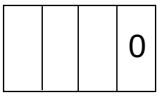
[

Clear the set Test No. by pressing **"C"** or **"STOP"** button.



[

Exit from the Test mode by pressing **"ALL RESET"** button.



2. Test Items and Operations

1) Sensor/SW Test

A beep sounds in two ways to tell the current condition.

Detection: 0.1 second interval beep
No detection: 0.5 second interval beep

No	Test Component	Detection Status	4200	4900	5900
01	Paper detection sensor	Reflected light is detected.	O	O	O
02	Paper size sensor	Reflected light is detected.	X	O	O
03	Elevator lower limit sensor	Light path is blocked.	O	O	O
04	Paper feed pressure switch	The switch is released.	X	O	O
05	Master loading button	The button is pressed.	O	O	O
06	Paper sensor	Light path is blocked.	O	O	O
07	Pressure detection sensor	Light path is blocked.	O	O	O
08	Position A sensor	Light path is blocked.	O	O	O
09	0° Angular sensor	Magnetism is detected.	O	O	O
10	180° Angular sensor	Magnetism is detected.	O	O	O
11	Position C sensor	Light path is blocked.	O	O	O
12	Feed-tray down button	The button is pressed.	O	O	O
13	Clamp safety switch	The switch is pressed.	O	O	O
14	Master sensor	Reflected light is detected.	O	O	O
15	Master positioning sensor	Reflected light is detected.	O	O	O
16	Drum home position button	The button is pressed.	O	O	O
17	Ink bottle switch	The switch is pressed.	O	O	O
18	Drum set switch	The switch is pressed.	O	O	O
19	Paper receiving sensor 1	Light path is blocked.	O	O	O
20	Paper receiving sensor 2	Light path is blocked.	O	O	O
21	Upper cover set switch	The switch is pressed.	O	O	O
22	Vertical centering sensor	Light path is blocked.	O	O	O
23	Master end sensor	No reflected light.	O	O	O
24	Paper feed clutch sensor	Light path is blocked.	O	O	O
25	Paper feed det. sensor	Light path is blocked.	O	O	O
26	Jump wing switch 1	The switch is pressed.	X	O	O
27	Jump wing switch 2	The switch is pressed.	X	O	O
28	Master removal sensor	Light path is blocked.	O	O	O
29	Master loading unit switch	The switch is pressed.	O	O	O
30	Front cover set sensor	Metal plate is attached.	O	O	O

NOTE: The status of the Elevator upper limit sensor can be checked by LED on the Motor control PCB. The LED lights up when the light path of the sensor is NOT blocked.

1) Sensor/SW Test

A beep sounds in two ways to tell the current condition.

Detection: 0.1 second interval beep
No detection: 0.5 second interval beep

No	Test Component	Detection Status	4200	4900	5900
31	TPH home position switch	The switch is pressed.	O	O	O
32	TPH pressure switch	The switch is pressed.	X	O	O
33	Disposal box set switch	The switch is pressed.	O	O	O
34	ADF original detection sensor	Light path is opened.	X	O	O
35	Original registration sensor	Light path is opened.	O	O	O
36	Original IN sensor	Light path is blocked.	O	O	O
37	Ink sensor	Ink is detected.	O	O	O
38	Overflow sensor	Ink is detected.	O	O	O
39	Main motor interlock switch	The switch is pressed.	O	O	O
40	Paper feed safety switch	The switch is released.	O	O	O
41	Paper feed cassette SW1	Magnetism is detected.	X	X	X
42	Paper feed cassette SW2	Magnetism is detected.	X	X	X
43	Paper feed cassette Sw3	Magnetism is detected.	X	X	X
44	Paper feed cassette SW4	Magnetism is detected.	X	X	X
45	Original OUT sensor	Light path is blocked.	O	O	O
46	ADF switch	The switch is pressed.	O	O	O
47	Master detection sensor	Reflected light detected.	O	O	O
48	Master loading sensor	Reflected light detected.	O	O	O
49	Scanner home position sensor	Light path is blocked.	X	X	O
50	Scanner ADF shading sensor	Light path is blocked.	X	X	O
51	Stage cover sensor	Light path is blocked.	X	X	O
52	Flat bed original det. sensor	Reflected light detected.	X	X	O
53	Pressure control sensor	Light path is blocked.	O	O	O
54					
55					
56					
57					
58	Battery detection signal	Battery is attached.	O	O	O
59	Option PCB detection signal	Option PCB is attached.	O	O	O

NOTE: The status of the Elevator upper limit sensor can be checked by LED on the Motor control PCB. The LED lights up when the light path of the sensor is NOT blocked.

2) Motor/Solenoid Test

No.	Test Item	No.	Test Item
60	15 rpm Drum rotation	71	Master removal solenoid & Vertical transport motor
61	30 rpm Drum rotation	72	Loading fan
62	Variable speed Drum rotation	73	Clamp solenoid
63		74	Lock solenoid
64	Separation Fan	75	Shading solenoid (4200 & 4900 only)
65	Write pulse motor CW (Feed)	76	Pickup solenoid
66	Loading pulse motor	77	Thermal power control
67	Paper feed clutch	78	Pickup motor
68	Pressure solenoid	79	LED array in Image scanner ON
69	Suction motor (fan)	80	Wing motor (5900 only)
70			

* Refer to the page on the "Memory Switch" for the Test modes **No.81** through **87**.

3) Memory Clear and Counter Stop, etc.

No.	Test Item
90	**Partial Memory Clear** Certain portion of RAM contents in the System PCB, such as Jam and Trouble messages, will be initialized. (The same operation as when turning the power ON while pressing All Reset button.)
91	**Master Making Width Check** (4900 & 5900 only)
92	**Prevention of the following operations: master and copy counting, Key/card counter and [E17] error signal display (for dead battery)** • In normal operation, the Master count and Copy count signals will not be output, allowing a service technician to print without increasing the digit of the Master and Copy counters. • The machine will be released from this condition when the power is turned off.
97	**All Memory Clear** All RAM contents in the System PCBs, excluding Memory switch settings by Test modes No.81 through 87, will be initialized. **NOTE: This test mode must be done each time System ROM or System PCB is changed.**
98	**Memory Switch Clear** Memory switch setting by Test modes No.81 through 87 will be initialized. **This test mode must be done each time System PCB is changed.** **[CAUTION]** **Do not use this test mode in normal operation.** **All the programmed Memory switch settings in the machine will be initialized.**

4) Sequential Operation Test

No.	Test Item
101	**Ink motor operation** A blank master is loaded on the Drum and the Auto idling operation starts. At the same time, the Inking motor operates to supply ink into the Squeegee until the Ink Sensor detects ink, and the Drum stops at the "A" detection (Home) position. • This test mode is used when filling an Inkless Drum with ink.
102	**Elevator motor Up/Down operation** The following operations will be repeated while pressing down the Feed-tray down button. • PRESS m Elevator UP m Upper limit sensor "ON" m Elevator Stop • PRESS m Elevator Down m Lower limit sensor "ON" m Elevator Stop
103	**Print positioning motor CW/CCW rotation (one-cycle check)** Return to vertical center position m One second halt m CW (+) direction rotation m One second halt m CCW (-) direction rotation m One second halt m Return to vertical center position m Stop.
104	**Clamp plate Open/Close operation** (Press START button again to stop) Rotate Drum to Home position m Open Clamp plate (180°) m One second halt m Close Clamp plate (0°) m Rotate Drum to home position (Then go back to the first step).
105	**ADF Original feed operation** (Press START button again to stop) Pick-up one original m Shading operation m Feed original m Eject original m Original detection sensor ON m Pick-up one original (Repeats this cycle until START button is pressed.) (4200 & 4900 only)
106	**Confidential operation (Repeated by three cycles)** Confidential operation m Pressure solenoid ON (one time Drum rotation) m Pressure solenoid OFF (five times Drum rotation). (This is repeated three times and the machine stops.)
107	**Paper feed & Printing operation** (Press START button again to stop) The paper feed tray raises and the paper is continuously fed until paper supply runs out. Note: • The Copy counter does not operate and paper jam is not detected. • Paper feed tray will be automatically lowered without paper. • Ink can be supplied by the Inking motor. • Printing speed & density keys can be operated.

4) Sequential Operation Test

No.	Test Item
108	**Flat bed read pulse motor (scanner) movement** (Press START button again to stop) Image scanner home position sensor (2 sec. halt) m Image scanner shading sensor (2 sec. halt) m FB-ADF scanning position (2 sec. halt) m Image scanner home position sensor (2 sec. halt) • • • (This is repeated until START button is pressed.) (5900 only)
109	**Machine aging operation** 130 rpm Drum rotation m 3000 times Magnet A detection m Stop.
110	**Elevator aging operation** UP m Upper limit sensor ON m Stop m DOWN m Lower limit sensor ON m Stop m UP (This cycle is repeated for 5000 times) m Stop.
111	**Thermal pressure motor** If the TPH home position switch is pressed: • TPH is lowered m TPH pressure switch is pressed m Stop. If the TPH pressure switch is pressed: • TPH is raised m TPH home position switch is pressed m Stop.
112	**Cutter motor ON [One-cut operation]**
113	**FB-ADF Original feed operation** (Press START button again to stop) Pick-up one original m Feed original m Eject original m Original detection sensor ON m Pick-up one original (Repeats this cycle until START button is pressed.) (5900 only)
114	**Pressure control motor** Center position m One second halt m Rotates to pressure setting No.12 m Rotates to pressure setting No.1 m Returns to center position (This cycle is repeated three times) m Stop.
115	**Ink Thermistor check** Ink thermistor is defective if "00" or "FF" is shown on the display. All other numbers indicate the thermistor is in good condition. * Displayed number is not the temperature.

4) Sequential Operation Test

No.	Test Item
116	**TPH Thermistor check** TPH thermistor is defective if "00" or "FF" is shown on the display. All other numbers indicate the thermistor is in good condition. * Displayed number is not temperature.
117	**Thermal print head check operation 1** Makes a master of test pattern #1 memorized in the Image processing PCB.
118	**Thermal print head check operation 2** Makes a master of test pattern #2 memorized in the Image processing PCB.
119	**Thermal print head check operation 3** Makes a master of test pattern #3 memorized in the Image processing PCB. (4900 & 5900 only)
120	**Thermal print head check operation 4** Makes a master of test pattern #4 memorized in the Image processing PCB. (4900 & 5900 only)

2. Memory Switch

The Memory switch settings can be reprogrammed to make fine adjustments in Image scanning and Master making. The Memory switch mode is started up by the same method as with Test mode. These Memory switch settings are not initialized by Test Mode No.90 or 97.

Caution:
Do not use Test mode **No.98** in normal operation.
Test mode No.98 initializes all the Memory switch settings made on the machine.

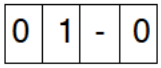
Memory Switches	4200	4900	5900
Memory Switch No.81 (Test mode No.81) ····· Refer to page VI-37 [Image Scanner ADF Home Position Adjustment] Adjusts the position of the Image scanner against the White roller (Read roller) to sharpen the blurred image caused by incorrect positioning of the Image scanner.	×	×	○
Memory Switch No.82 (Test mode No.82) ····· Refer to page VI-32 [Scanning Start Position Adjsutment] When scanning on the Stage glass without selecting the BOUND BOOK CENTER mode.	×	×	○
Memory Switch No.83 (Test mode No.83) ····· Refer to page V-23 Refer to page VI-36 [Horizontal Scanning Position Adjustment] When using ADF Unit for scanning.	○	○	○
Memory Switch No.84 (Test mode No.84) ····· Refer to page VI-36 [Horizontal Scanning Position Adjustment] When scanning on the Stage glass.	×	×	○
Memory Switch No.85 (Test mode No.85) ····· Refer to page VII-17 [Master Making length (Write Pulse Motor Operation Time) Adjustment] Adjusts the master making length by controlling the operation time of the Write pulse motor.	○	○	○
Memory Switch No.86 (Test mode No.86) ····· Refer to page V-21 Refer to page VI-33 [Scanning Start Position Adjustment] When using ADF Unit for scanning.	○	○	○
Memory Switch No.87 (Test mode No.87) ····· Refer to page VI-32 [Scanning Start Position Adjustment] When scanning on the Stage glass with BOUND BOOK CENTER mode selected.	×	×	○

3. Users Mode

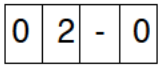
The users mode program enables a machine operator to select the initial operation settings of the machine.
This mode is explained in "User Guide" and is intended for customers to make a selection if required.
NOTE: The selections in boldface in the chart below are the standard initial settings (at factory shipment).

1. [Starting Up Users Mode]
Turn ON the power.
Press **8** key of the print quantity keys while pressing down the ★ key.
This makes access to the User mode.

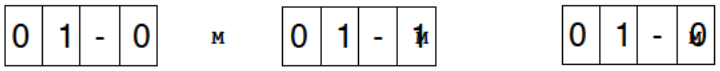
2. [Making Selections]
After the access is made, select the item(s) whose initial setting is required to be changed.
The first item which appears on the display is item No. 01.



If another item is desired, select it using the print quantity keys.
When selecting item No.02, for example, press "0" and "2".



Now choose either of the two initial settings for the selected item.
The selection is made by pressing the "START" button.
The digit in the far right column of the display changes from "0" to "1" or "1" to "0".
"0" and "1" appears alternately each time the "START" button is pressed.



Repeat this procedure until all required changes are made.
To exit from this mode, press the "ALL RESET" button for 1 second.
All new initial settings are memorized and the dispaly returns to normal operation.

Item Number	Initial Setting Item	Enter "0" (factory setting)	Enter "1"	4200	4900	5900
01	Print Speed	**100 sheets/min.**	60 sheets/min.	○	○	○
02	Auto Print Feature	**OFF**	ON	○	○	○
03	Jump Wing operation	**Active**	Inactive	×	○	○
04	Displayed Print Q'ty	**0**	1	○	○	○
05	Auto Image Area Limitation	**Active**	Inactive	×	○	○
06	Auto Reset Time	**None**	5 minutes	○	○	○
08	Auto Idle Period	**12 hours**	6 hours	○	○	○
09	Bound Book Center mode	**OFF**	ON	×	×	○
10	Paper Feed Det. Sensor	**Active**	Inactive	○	○	○
11	Waiting time for the 2nd original when using 2UP	**None**	15 seconds	×	×	○

4. Advice Displays

No.	Display Condition	Resetting Method
E 01	**Main Motor Lock** Displayed to interrupt the machine operation: 1) If the Drum position A is still detected by the Position A detection sensor **2 seconds** after the Main motor started. 2) If the Drum position A hasn't been detected by the Position A detection sensor within **5 seconds** after the Main motor is started.	Press **ALL RESET** button.
E 02	**Elevator Motor Lock** Displayed to interrupt the machine operation: 1) If the actuator of the Elevator upper limit sensor is not raised within **9 seconds** after the Elevator motor started to raise the Paper feed tray. 2) If the light path of the Elevator lower limit sensor is not blocked within **9 seconds** after the Elevator motor started to lower the Paper feed tray. 3) If the light path of the Elevator lower limit sensor is blocked **2 seconds** after the Elevator motor started to raise the Paper feed tray. 4) If the actuator of the Elevator upper limit sensor is still raised **2 seconds** after the Elevator motor started to lower the Paper feed tray.	Press **ALL RESET** button.
E 03	**Clamp Error 1** Displayed to interrupt the machine operation: 1) If the actuator of the Clamp safety switch is still depressed **4 seconds** after the Clamp solenoid was activated (turned on). 2) If the actuator of the Clamp safety switch has not been depressed within **4 sec.** after the Clamp solenoid was released (turned off). 3) If the Angular magnet has not been detected by the Angular sensor (either 0° or 180°) within **8 seconds** after the Clamp motor started rotating. 4) If the actuator of the Clamp safety switch is not depressed when the Clamp solenoid is not in operation.	Press **ALL RESET** button.
E 04	**Ink Overflow** Displayed to interrupt the machine operation: 1) If the Overflow sensor detects excessive ink in the Squeegee unit.	**Overflow sensor** OFF
E 05	**Print Positioning Motor Lock** Displayed to interrupt the machine operation: 1) If the Vertical centering sensor status has not been changed from ON to OFF (or OFF to ON) within **12 seconds** after the Print positioning motor started rotating.	Press **ALL RESET** button.
E 06	**Pressure Detection Sensor Malfunction** Displayed to interrupt the machine operation: 1) If the Pressure detection sensor status has not been changed from ON to OFF (or OFF to ON) within **8 seconds** after the Main motor started rotating.	Press **ALL RESET** button.

No.	Display Condition	Resetting Method
E 07 (Only in RA59)	**Communication error between RA and RA Digitizer** Displayed to interrupt the machine operation: 1) If a communication error has occurred between the CPU and RA digitizer.	Turn **Power SW** OFF & ON.
E 08	**Communication error between RA and Interface Accessaries** Displayed to interrupt the machine operation: 1) If a communication error has occurred between the CPU and the interface accessaries.	Turn **Power SW** OFF & ON.
E 09	**Communication error between RA and the Sorters** Displayed to interrupt the machine operation: 1) If a communication error has occurred between the CPU and the sorters.	Turn **Power SW** OFF & ON.
E 10 (Only in RA59)	**Malfunction of Trimming PCB** Displayed to interrupt the machine operation: 1) If data signals such as original size, are not output from the **Trimming PCB** at the start of the image scanning operation.	Press **ALL RESET** button.
E 11	**Pressure Control Motor Lock** Displayed to interrupt the machine operation: 1) If the pulse from the Encoder disc on the Pressure control motor has not been detected within **100ms** from the start of the Pressure control motor. 2) If the Pressure centering sensor status has not been changed from ON to OFF (or OFF to ON) within **5 seconds** from the start of the Pressure control motor.	Press **ALL RESET** button.
E 12	**Machine Model Selection Error** Displayed to prevent the machine operation: The SW2 (HEX SW) selection on the System PCB is set to "Not Used" position.	Turn **Power SW** OFF & ON.
E 13	**Cutter Motor Lock** Displayed to interrupt the machine operation in master-making and confidential process: 1) If master is detected by the Master positioning sensor at Drum A position after the cutting operation and besides it is still detected by the Master positioning sensor at the next Drum A position detection after the second cutting operation.	**Drum Set SW** OFF & ON
E 14	**Clamp Error 2** Displayed to interrupt the machine operation: 1) If the actuator of the Clamp safety switch is not depressed when the Clamp solenoid is not in operation.	Press **ALL RESET** button.

No.	Display Condition	Resetting Method
E 15 Only in RA59	**Flat Bed Read Pulse Motor Lock** Displayed to interrupt the machine operation: 1) If the Image scanner home position sensor does not detect the Image scanner within **18898 pulses** after the Flat bed read pulse motor is activated. 2) If the Image scanner ADF Shading sensor does not detect the Image scanner within **15748 pulses** after the Flat bed read pulse motor is activated. 3) If the Image scanner is not release from the Image scanner home position sensor within **314 pulses** after the Flat bed read pulse motor is activated. 4) If the Image scanner is not released from the Image scanner ADF Shading sensor within **314 pulses** after the Flat bed read pulse motor is activated.	Press **ALL RESET** button
E 16	**Position C Sensor Malfunction** Displayed to interrupt the machine operation: 1) If the Position C sensor status has not been changed from ON to OFF (or OFF to ON) within **8 seconds** from the start of the Main Motor.	Press **ALL RESET** button.
E 17	**Replace Battery** Displayed to interrupt the machine operation: 1) If the Battery detection signal is OFF at either of following three cases. <1> when the machine power is turned ON <2> when All reset button is pressed <3> at the end of machine operation.	Press **ALL RESET** button.
E 18	**Sorter Error** Displayed to interrupt the machine operation: 1) If an error signal is received from the sorter.	Turn **Power SW** OFF & ON.
E 19	**Thermal Pressure Motor Lock** Displayed to interrupt the machine operation: 1) If the TPH Pressure switch has not been depressed within **4 seconds** after the TPH Pressure motor was activated to lower the TPH. 2) If the TPH Pressure switch has not been released within **4 seconds** after the TPH Pressure motor was activated to raise the TPH.	Press **ALL RESET** button.
E 20	**Wing Motor Lock** Displayed to interrupt the machine operation: 1) If neither of the Jump wing sw1 or sw2 has been depressed within **5 seconds** after the Wing motor was activated. 2) If neither of the Jump wing sw1 or sw2 has been released within **5 seconds** after the Wing motor was activated.	Press **ALL RESET** button.

No.	Display Condition	Resetting Method
E 21	**Master Loading Error (onto the Drum)** Displayed to interrupt the machine operation: 1) If the Master load sensor does not detect master at the Drum C-1 position during loading of the master on the Drum.	Open & close the **Master Loading Unit**. Then press **"START"** button.
E 22	**Master Mis-Feed** Displayed after the master has been loaded onto the Drum in the master making or confidential process: 1) If the Master positioning sensor has not detected master material within **787 pulses** (**536 pulses** in confidential process) after the Loading pulse motor started following the master cutting operation. --- Displayed to interrupt the machine operation when the Master loading button was pressed: 1) If the Master positioning sensor has not detected master material within **1260 pulses** after the Loading pulse motor was turned on. 2) If the Master positioning sensor has not detected master material within **787 pulses** after the Loading pulse motor was turned on following the operation of the Cutter motor and the cut master material is removed.	Open & close the **Master Loading Unit**.
E 23	**Master Cut Malfunction** Displayed to interrupt the machine operation in master-making and confidential process: 1) If master is detected by the Master positioning sensor at Drum A position after the cutting operation and besides it is not detected by the Master positioning sensor at the next Drum A position detection after the second cutting operation.	**Drum Set SW** OFF & ON
E 24	**A Cut Piece of Master Remains inside the Machine** Displayed: 1) If the Master positioning sensor detects master material (the reflected light) just after the master cut operation is completed.	Remove the cut master strip.
E 25	**Master Removal Error** Displayed after the Image scanning and Master making operations are completed or in the confidential operation: 1) If the Master removal sensor does not detect a removed master while the Drum rotates from C-1 to A position, during master removal operation. 2) If the light path of the Master removal sensor is still blocked by a removed master when the Vertical transport motor stops.	**Drum Set SW** OFF & ON and press **"START"** button again.
E 26	**Removed Master Jammed at the entrance of Master disposal box.** Displayed: 1) If the light path of the Master removal sensor is blocked at the start of master-making operation.	Remove the jammed master.

No.	Display Condition	Resetting Method
E 27	**No Master on Drum** Displayed to interrupt the machine operation: 1) If the Master sensor does not detect master on the drum at the Drum A position when the printing starts.	Press **ALL RESET** button.
E 31	**Paper Jam in the Second Paper Feed Area** Displayed to interrupt the machine operation: 1) If the Paper sensor malfunctions. 2) If the Paper sensor detects paper when the Pressure detection sensor detects the Pressure disc. 3) If at the Drum A position, the Paper receiving sensor 1 does not detect paper and at the next Drum A position, the Paper sensor detects the paper.	Remove the jammed paper, or Press **ALL RESET** button.
E 32	**Paper Jam around Paper Receiving Sensor 1** Displayed to interrupt the machine operation: 1) If the Paper receiving sensor 1 detects paper when the Pressure detection sensor detects the Pressure disc. 2) If the Paper receiving sensor 2 detects paper when the Paper receiving sensor 1 detects the next sheet of paper.	Remove the jammed paper, or press **ALL RESET** button.
E 33	**Paper Jam in the First Paper Feed Area** Displayed to interrupt the machine operation: 1) If the Paper sensor has not detected paper while the Position A sensor detects the A position three times.	Press **ALL RESET** button.
E 34	**Paper Jam under the Drum** Displayed to interrupt the machine operation: 1) If the Paper receive sensor 1 does not detect paper at the Drum A position and the Paper sensor does not detect the paper at the next Drum A position.	**Drum Set SW** OFF & ON, or Press **ALL RESET** button.
E 36	**Original Misfeed** Displayed to interrupt the machine operation: 1) If the actuator of the Registration sensor is not opened within **1.35 seconds** after the Original pickup motor was turned on.	Remove the original.
E 37	**Original Jam at Entrance** Displayed to interrupt the machine operation: 1) If the Original IN sensor has not detected an original within **630 pulses** after the Read pulse motor was turned on.	Remove the original.
E 38	**Original Jam or Oversize** Displayed after the master has been loaded onto the Drum: 1) If the light path of the Original IN sensor is blocked for **14,173 pulses** (FB type **= 14,803**) after the Read pulse motor is turned on.	Remove the original.
E 39	**Original Jam at the Exit** Displayed after the master has been loaded onto the Drum: 1) If the Original OUT sensor has been blocked for **1,890 pulses** after the Read pulse motor was turned on.	Remove the jammed original.

No.	Display Condition	Resetting Method
Number is not dis-played	**Replace Ink Bottle** Displayed to interrupt the machine operation: 1) If the Ink sensor does not detect ink in the Squeegee unit within **30 seconds** after the Inking motor was started.	Replace the empty Ink bottle with a new one.
Number is not dis-played	**Replace Master Roll** Displayed to interrupt the machine operation: 1) If the black tape attached at the end of the Master roll has been detected by the Master end sensor during master making or confidential operation.	Replace the de-pleted Master roll with a new one.
Number is not dis-played	**Empty Disposal Box** Displayed after the machine operation is finished: 1) If the disposed master is detected 40 times (50 for A4-drum models) by the Master removalsensor after the Disposal box was emptied.	Empty the Disposal box.
Number is not dis-played	**Add Paper** Displayed to interrupt the machine operation: 1) If the light path of the Paper detection sensor is open.	Add paper on the **Paper feed tray**.
Number is not dis-played	**Non-Compatible Master Roll (1)** Dispalyed to prevent the machine operation: 1) If non-compatible master roll is installed in the machine.	**Master detection sensor** OFF & ON.
E 45	**Non-Compatible Ink Bottle (1)** Displayed to prevent machine operation: 1) If non-compatible ink bottle is installed in the machine.	**Ink bottle switch** OFF & ON.
E 46	**Non-Compatible Master Roll (2)** Displayed to prevent machine operation: 1) If non-compatible master roll is installed in the machine.	**Master detection sensor** OFF & ON or press **ALL RE-SET** button.
E 47	**Non-Compatible Ink Bottle (2)** Displayed to prevent machine operation: 1) If non-compatible ink bottle is installed in the machine.	**Ink bottle switch** OFF & ON or press **ALL RESET** button.
E 48	**Connect "Copy/Master" Counter** Displayed to interrupt or prevent machine operation: 1) If the connector of the copy and master counter comes loose or if the counter is removed.	Connect the **Copy & master counter**.
E 50	**Insert Card into Key/Card Counter** Displayed to prevent the machine operation: 1) If an operator card is not set in the Key/Card counter.	Insert the card.
E 51	**Set Drum in Place** Displayed to prevent the machine operation: 1) If the actuator of the Drum set switch is not depressed.	Set the **Drum** in machine.
E 52		

No.	Display Condition	Resetting Method
E 53	**Set Ink Bottle in Place** Displayed to prevent the machine operation: 1) If the actuator of the Ink bottle switch is not depressed.	Set the Ink bottle firmly in the **Drum**.
E 54	**Set Leading Edge of Master Under Green Films** Displayed to prevent the machine operation: 1) If the Master detection sensor does not detect master material (the reflected light).	Install a Master roll and insert an edge of Master under **Green films**.
E 55	**Close Front Cover** Displayed to prevent the machine operation: 1) If the metal plate is not attached to the Front cover set sensor.	Press on the lower right part of the **Front cover**.
E 56	**Close Original Feed Table (Top Cover)** Displayed to prevent the machine operation: 1) If the safety switch is not pressed by the Original feed table (Top cover).	Close the **Original feed table.**
E 57	**Set Master Disposal Box in Place** Displayed to prevent the machine operation: 1) If the actuator of the Disposal box set switch is not depressed.	Place the **Master disposal box** in place.
E 58	**Close Master Loading Unit** Displayed to prevent the machine operation: 1) If the actuator of the Master loading unit switch is not depressed.	Close the **Master loading unit**.
E 59	**Close ADF Unit** Displayed to prevent the machine operation: 1) If the actuator of the ADF unit set switch is not depressed.	Close the **ADF unit**.
E 60	**Paper Feed Tray Emergency Stop** Displayed to interrupt the machine operation: 1) If the safety switch over or under the Paper feed tray is activated.	Check and remove any obstacle which activated the **Safety switch**.
E 61	**Drum Size Error** Displayed to prevent the machine operation: 1) If a wrong size drum is set in the machine.	Place a correct size **Drum** in place.
E 62	**Drum Brand Error** Displayed to prevent the machine operation: 1) If a wrong brand drum is set in the machine.	Place a correct brand **Drum** in place.
E 66	**Ink Bottle / Master Holder Registration Error** Displayed to prevent the machine operation: 1) If wrongly registered ink bottle or master holder is set in machine.	Place a correct ink bottle or master roll in place.
E 67	**PI PCB Missing** Displayed to interrupt the machine operation: 1) PI CPB is missing or connecotr disconnected.	Connect the **PI PCB**.

No.	Display Condition	Resetting Method
E 68	**Bulk Sheet Feeder Power Malfunction** Displayed to interrupt the machine operation: 1) If the Bulk sheet feeder encounters power failure.	Disconnect the **Bulk sheet feeder** from RA.
E 69	**Bulk Sheet Feeder Error** Displayed to interrupt the machine operation: 1) If the Bulk sheet feeder malfunctions.	Press **ALL RESET** button.
E 71	**Sorter Error - Paper jammed in Sorter** Displayed to interrupt the machine operation: 1) If paper has jammed in the sorter.	Open the **Sorter door** and remove the jammed paper.
E 72	**Sorter Error - Sorter door (or cover) is open** Displayed to prevent the machine operation: 1) If the door (or cover) of the sorter is open.	Close the **Sorter door (or cover)**.
E 73	**Sorter Error - Paper remains in Sorter** Displayed to prevent the machine operation: 1) If the sorted sheets remain in the sort bins.	Open the **Sorter door** and remove the sheets.
E 74	**Sorter Error - Sorter bins are full** Displayed to interrupt the machine operation: 1) If the sort bins are full of sorted sheets.	Open the **Sorter door** and remove the sheets.
E 75	**Sorter Error - Wrong paper size is selected** Displayed to prevent the machine operation: 1) If the paper size selection on the sorter does not match with the size of the paper loaded on the Paper feed tray.	Select a correct paper size on the Sorter.
E 76	**Sorter Error - Unavailable paper size** Displayed to prevent the machine operation: 1) If the size of the paper loaded on the Paper feed tray is out of the range of paper size which can be used in the sorter.	Replace the paper on the Paper feed tray with a correct one.
E 79	**Paper Tape has run out in Job Separator** Displayed to interrupt the machine operation: 1) If the Tape end sensor has detected the end of a paper tape roll.	Put a new roll of paper tape in the Job separator.

1. Paper Jams

Three sensors, i.e. Paper sensor, Paper receive sensors 1 and 2, watch for any paper jam in the machine during the printing operation.
The paper jams are divided into the following four cases.

1) Paper Jam in the First Paper Feed Area

The Paper sensor checks whether the paper is correctly supplied into the machine from the Paper feed tray during the printing operation.

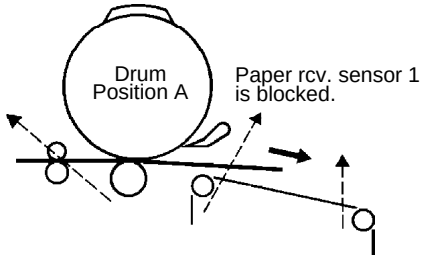
- In printing operation, if the Paper sensor does not detect any paper before the Drum comes to the Drum Position A for the third time, i.e. the Drum has turned three times without the light path of the Paper sensor blocked, the machine assumes that the paper has jammed in the first paper feed area and indicates the error code **[E 33]**.

2) Paper Jam in the Second Paper Feed Area / Paper Jam under the Drum

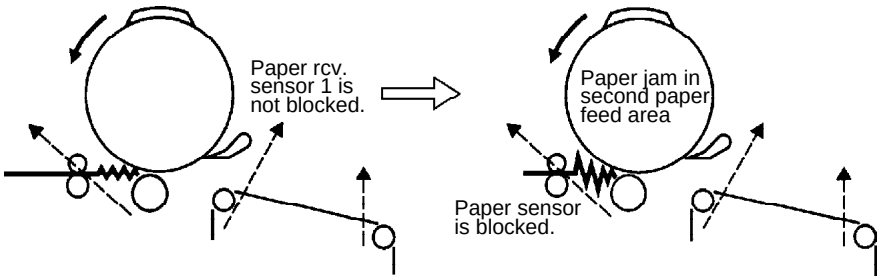
The Paper receive sensor 1 checks whether the paper is correctly discharged out from the machine during the printing operation.

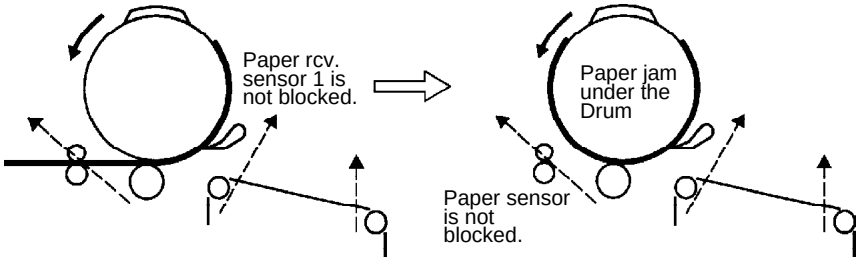
- If the light path of the Paper receiving sensor 1 is not blocked by a sheet of paper when the Drum comes to the Drum Position A, the machine assumes that the paper has jammed.
  The machine assumes that the paper has jammed in the second paper feed area if the paper sensor detects a sheet of paper at the next Drum Position A. The error code **[E 31]** is indicated.
  The machine assumes that the paper has jammed under the Drum if the Paper sensor does not detect any paper at this second Drum Position A. The error code **[E 34]** is indicated.

Normal paper feeding



First Drum Position A **Next Drum Position A**



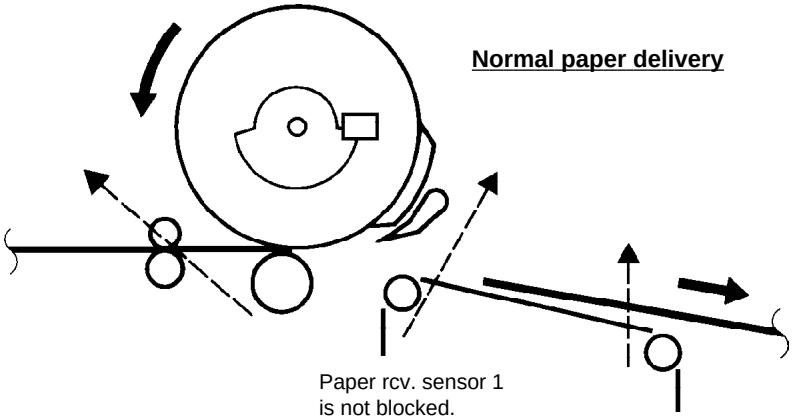


3) Paper Jam at Paper Receiving Sensor 1
4) Paper Jam at Paper Receiving Sensor 2

3) Paper Jam at Paper Receiving Sensor 1

The Paper receiving sensor 1 checks whether the printed paper is correctly delivered from the printing area onto the Suction unit.

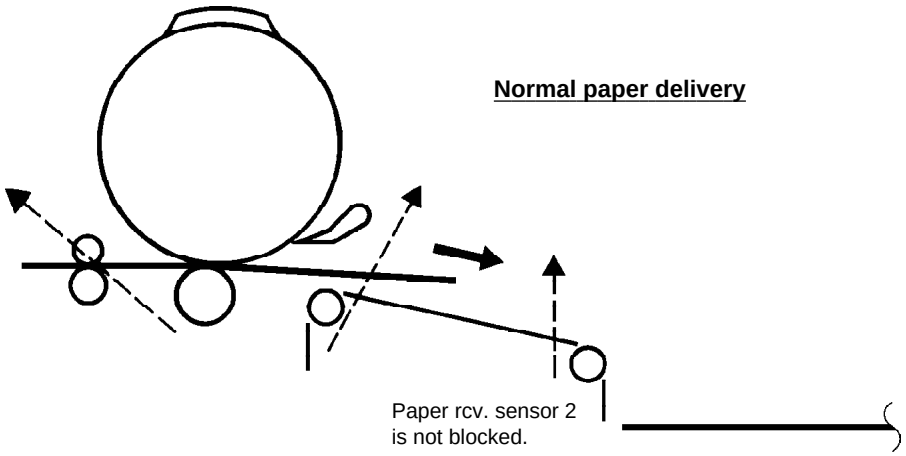
- During the printing operation, if the Paper receiving sensor 1 does not detect any paper when the condition of the light path of the Pressure detect sensor changes from "open" to "blocked", the machine assumes the paper delivery on the Suction unit is normal.
  If the Paper receiving sensor 1 detects a sheet of paper at the above condition, the machine assumes the paper has jammed at the Paper receiving sensor 1 and indicates the error code **[E 32]**.



4) Paper Jam at Paper Receiving Sensor 2

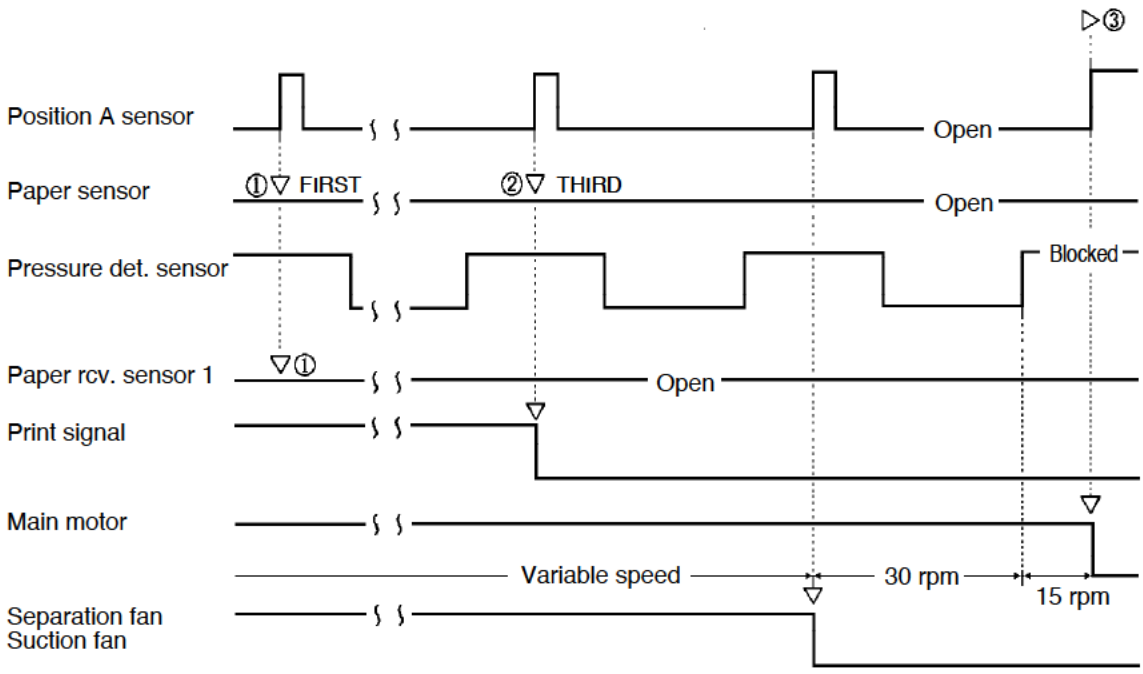
The Paper receiving sensor 2 checks whether the printed paper is correctly delivered on the Suction unit to the Paper receiving tray.

- During the printing operation, if the condition of Paper receiving sensor 2 changes from "paper detection" to "no paper detection" or vice versa, before the Drum Position A is checked twice, the machine assumes the paper delivery onto the Paper receiving tray is normal.
  If the Paper receiving sensor 2 keeps detecting a sheet of paper while the Drum Position A is checked twice, the machine assumes the paper has jammed at the Paper receiving sensor 2 and indicates the error code **[E 32]**.



- Timing Chart -

Paper Jam In the First Paper Feed Area



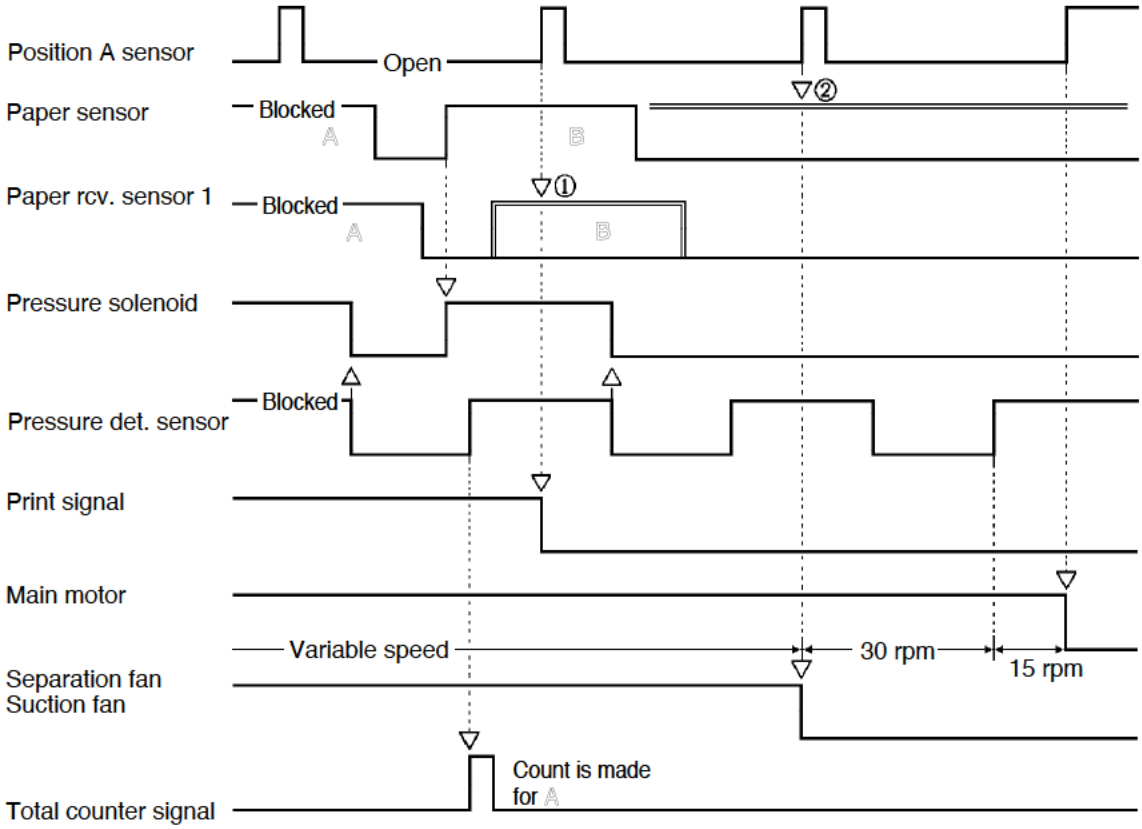
① If the Paper sensor detects no paper, the Paper receiving sensor 1 should detect no paper.
If the Paper receiving sensor 1 detects paper, the machine assumes that the paper has jammed at the Paper receiving sensor 1, whose timing chart is shown on page APX (II)-5.

② If the Paper sensor has detected no paper by the time the Drum makes its third turn, the machine assumes that the **paper has jammed at the First paper feed area**, and turns OFF the Print signal.

③ When the Drum stops, the error code **[E 33]** is displayed.

- Timing Chart -

Paper Jam In the Second Paper Feed Area / Paper Jam under the Drum

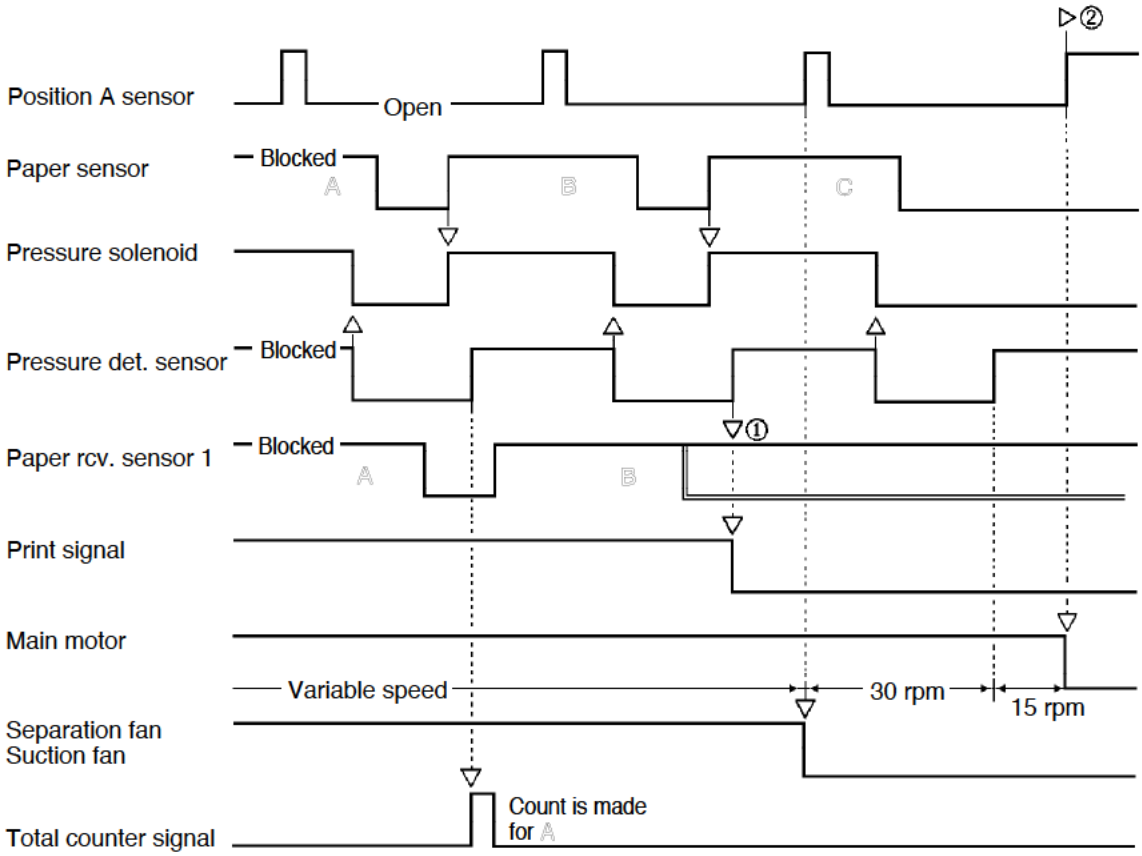


① If the Paper receiving sensor 1 detects no paper, the machine assumes that the paper has jammed, and turns the Print signal OFF.

② At the next Drum Position A, the status of the Paper sensor is checked and if the Paper sensor detects a paper, the machine assumes that the **paper has jammed at the Second paper feed area**, and indicates the error code **[E 31]**.
But if the Paper sensor detects no paper, the machine assumes the **paper has jammed under the Drum**, and indicates the error code **[E 34]**.

- Timing Chart -

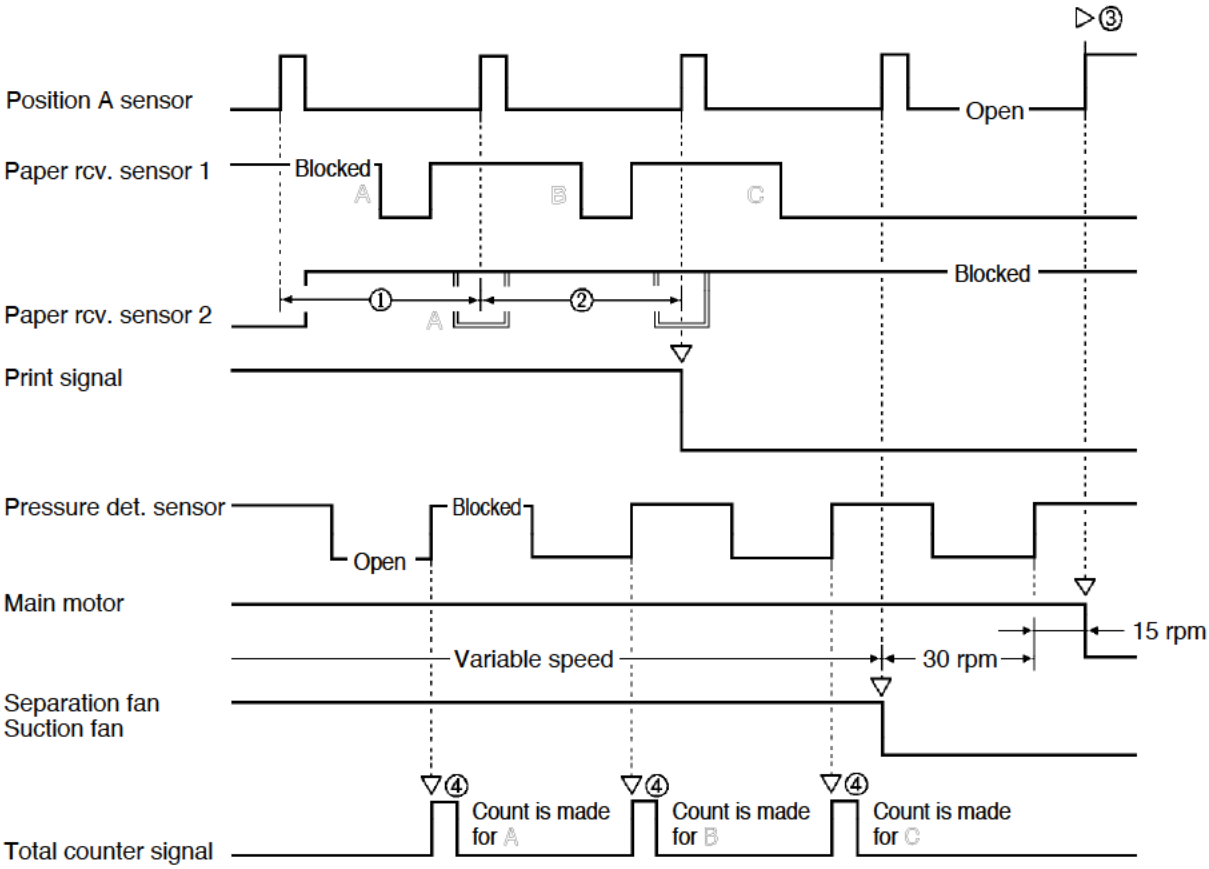
Paper Jam at Paper Receiving Sensor 1



① If the Paper receiving sensor 1 still detects a sheet of paper, the machine assumes the **paper has jammed at the Paper receiving sensor 1**, and turns the Print signal OFF.
② When the Drum stops, the error code **[E 32]** is displayed.

- Timing Chart -

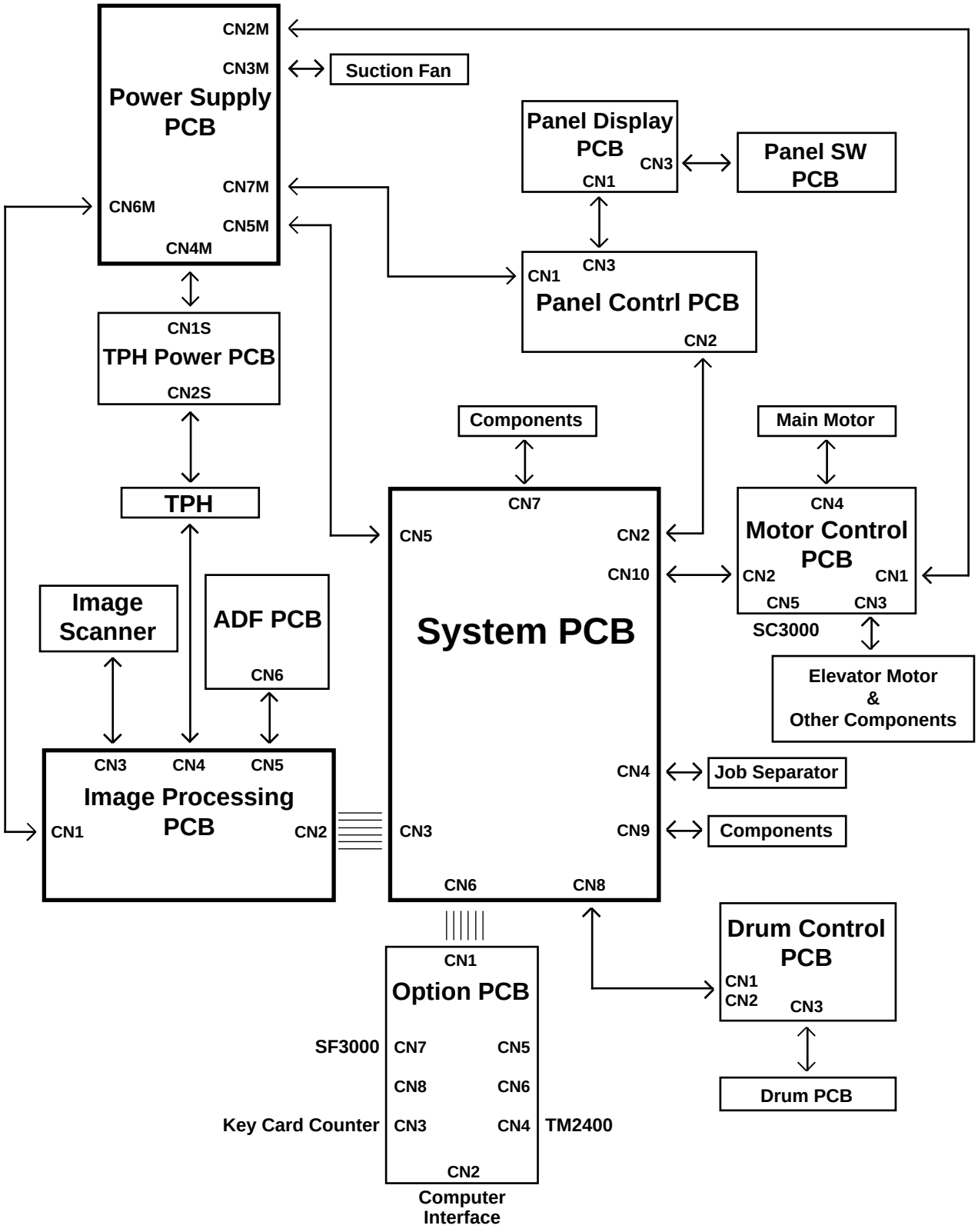
Paper Jam at Paper Receiving Sensor 2



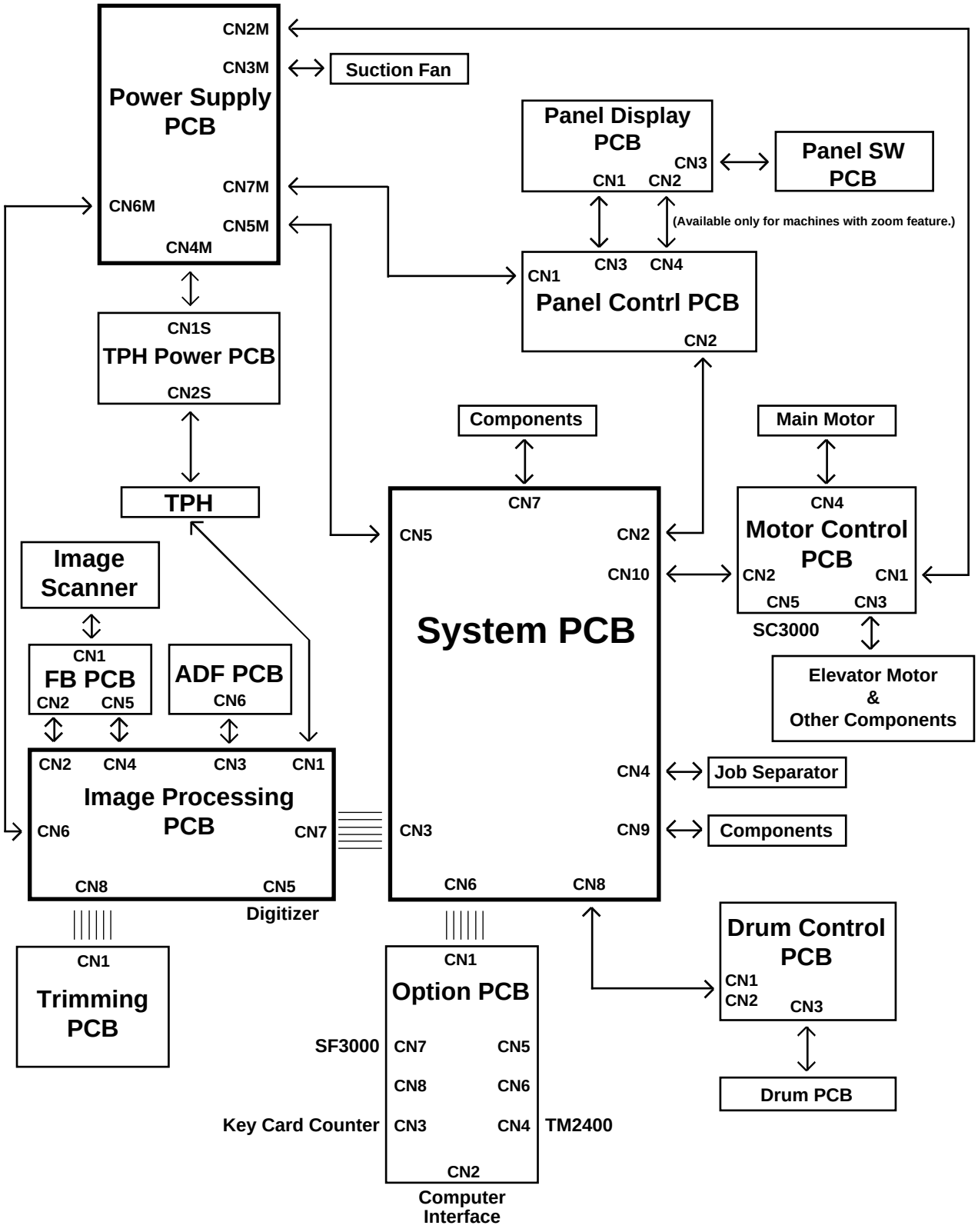
① Between the respective Drum Positions A, it is checked if the light path of the Paper receiving sensor 2 is opened.
② If the Paper receiving sensor 2 keeps detecting a sheet of paper while the Drum Position A is checked twice, the machine assumes the paper has jammed at the Paper receiving sensor 2, and turns the Print signal OFF.
③ When the Drum stops, the error code **[E 32]** is displayed.
④ A sheet is assumed to be printed each time the status of the light path of the Paper receiving sensor 1 changes from "Blocked" to "Open" after it is confirmed that of the Paper sensor changed from "Blocked" to "Open".
Then as the light path of the Pressure detection sensor is blocked, the Total counter signal is turned ON to add one count on the Total counter.

1.Description of PCBs

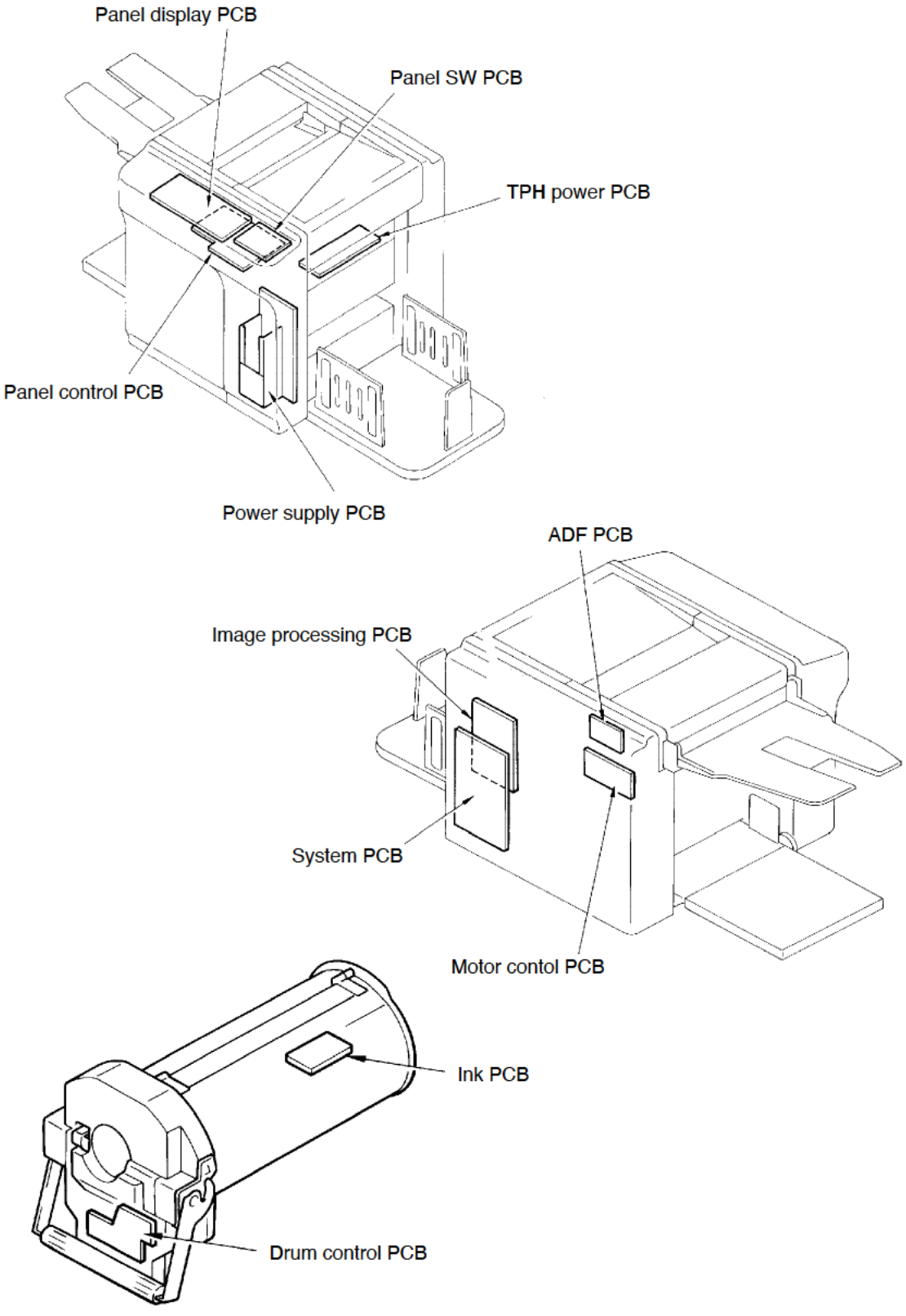
1. Block Chart (RA4200 & 4900)



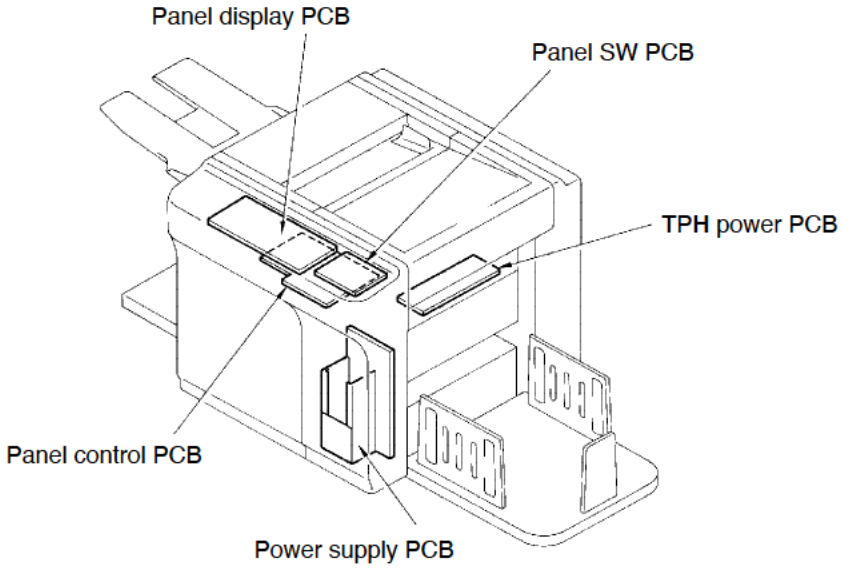
2. Block Chart (RA5900)

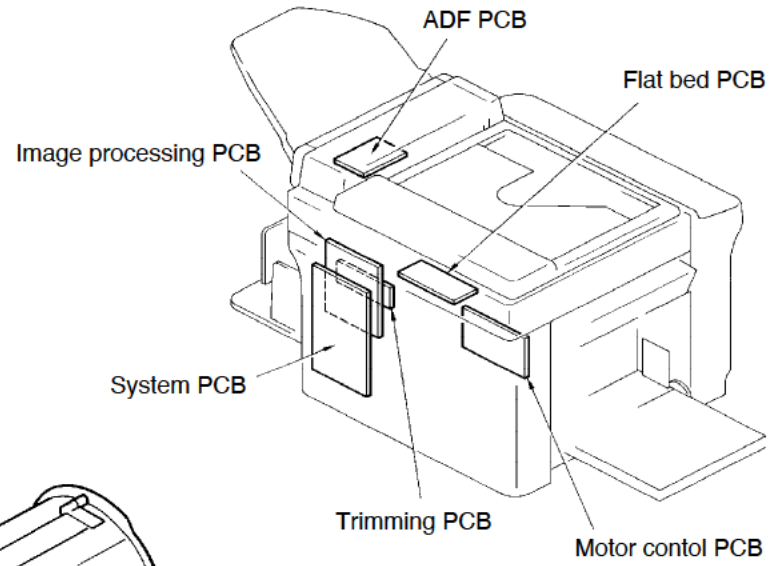


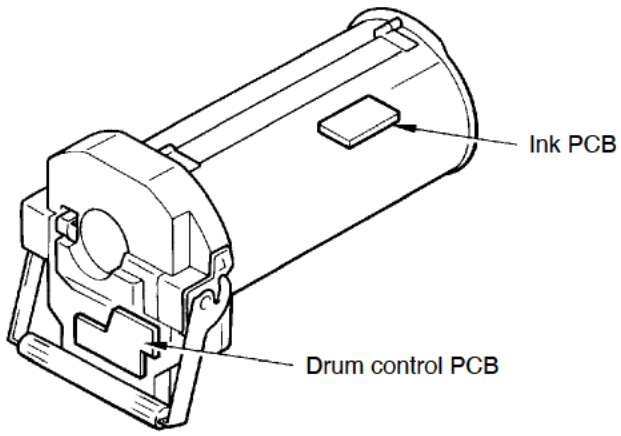
3. Location of PCBs (RA4200 & 4900)



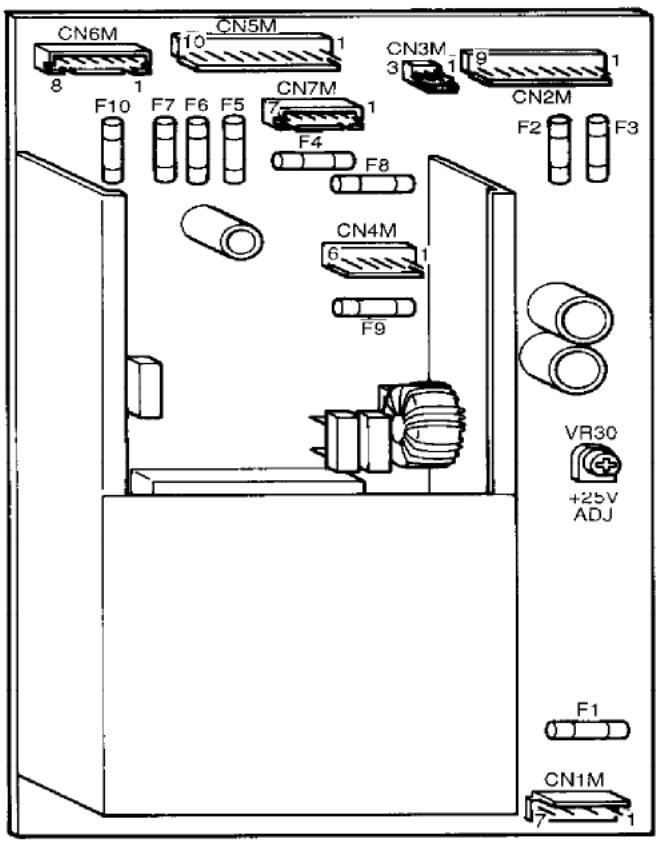
4. Location of PCBs (RA5900)







5. Power Supply PCB



CN

CN1 : From Main power switch
CN2 : To Motor control PCB
CN3 : To Suction fan
CN4 : To TPH power PCB
CN5 : To System PCB
CN6 : To Image processing PCB
CN7 : To Panel control PCB

VR

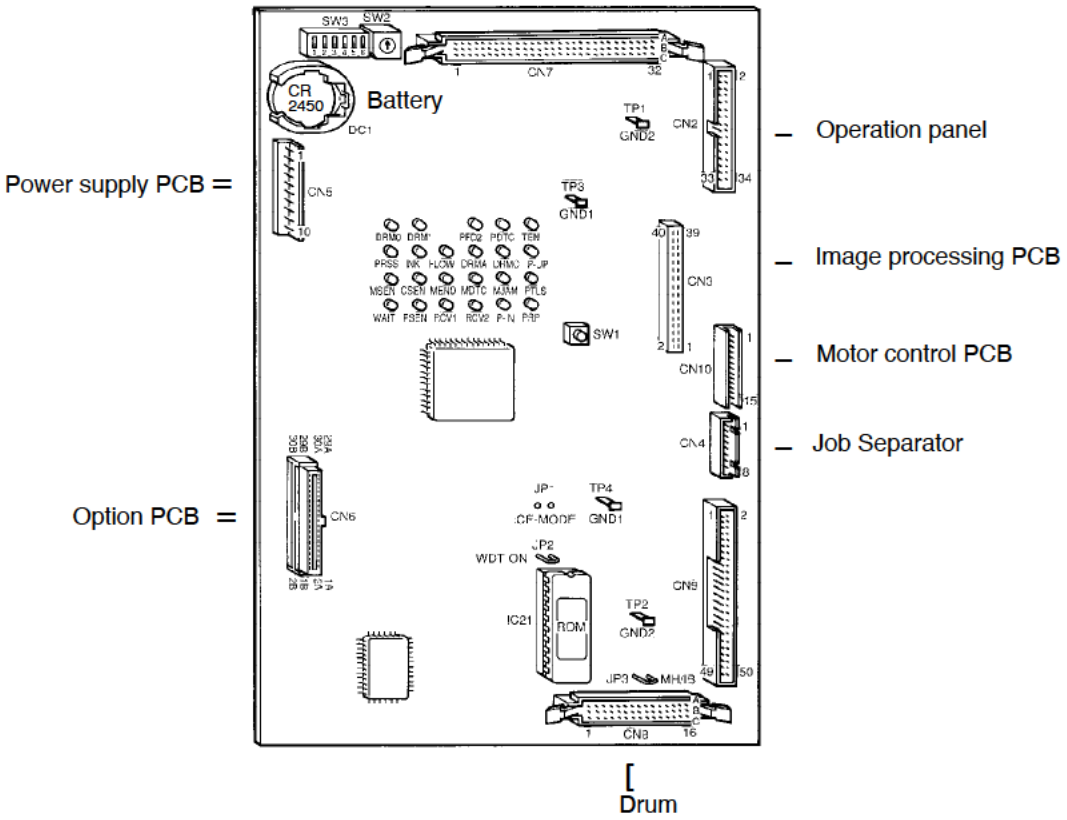
VR30: For adjustment of +25V output.

FUSE

F1 (10A/125V) F1 (5A/250V)	Main Fuse for 120V Machine Main Fuse for 240V Machine	AC120V AC240V
F2 (8A/125V)	+24V (CN2M, Pins 3 & 4)	Motor control PCB
F3 (1A/125V)	+24V (CN2M, Pin 1)	Motor control PCB
F4 (3.15A/125V)	+24V(a) (CN5M, Pin 7)	System PCB (a)-system
F5 (3.15A/125V)	+24V(b) (CN5M, Pin 8)	System PCB (b)-system
F6 (3.15A/125V)	+24V(c) (CN5M, Pin 9)	System PCB (c)-system
F7 (3.15A/125V)	+24V(d) (CN6M, Pin 5)	Image processing PCB
F8 (1A/125V)	+24V (CN3M, Pin 3)	Suction motor
F9 (3.15A/125V)	+ 5V (CN2M, Pin 8) (CN5M, Pin 1) (CN6M, Pin 7) (CN7M, Pins 7 & 8)	Motor control PCB, System PCB & Panel control PCB, Image processing PCB.
	+12V (CN5M, Pin 3) (CN6M, Pin 8) (CN7M, Pin 5)	System PCB & Panel control PCB
	+15V (CN6M, Pin 3)	Image processing PCB
F10 (3.15A/125V)	- 12V (CN6M, Pin 1) (CN7M, Pin 6)	Image processing PCB & Panel control PCB

5. Power Supply PCB

6. System PCB



SW

SW1 : Drum (Main Motor) 30 rpm

SW2 : Machine Selection HEX SW

SW	SheetType	Flat Bed Type
0	Not Used	Not Used
1	Not Used	Not Used
2	Not Used	Not Used
3	**RA4050(B4)**	Not Used
4	**RA4200(B4)**	**RA4300(B4)**
5	**RA4900(B4)**	Not Used
6	Not Used	**RA5900(B4)**
7	**RA4050(A4)**	Not Used
8	**RA4200(A4)**	**RA4300(A4)**
9	**RA4900(A4)**	Not Used
A	Not Used	**RA5900(A4)**
B	**RA4050(Legal)**	Not Used
C	**RA4200(Legal)**	**RA4300(Legal)**
D	**RA4900(Legal)**	Not used
E	Not Used	**RA5900(Legal)**
F	Not Used	Not Used

SW3 : Machine Selection DIP SW

Sheet Type: (RA4050, 4200 & 4900)

SW	OFF	ON
1	●	
2	●	
3	●	
4	●	
5	●	
6	●	

Flat-bed Type: (RA4300 & 5900)

SW	OFF	ON
1		●
2	●	
3	●	
4	●	
5	●	
6	●	

6. System PCB

LED

LED	Sensor Name	When LED is ON
DRM0	0° Angular Sensor	Magnetism is detected.
DRM1	180° Angular Sensor	Magnetism is detected.
PFD2	Paper Feed Clutch Sensor	Light path is blocked.
PDTC	Paper Detection Sensor	Reflected light detected.
TEN	Vertical Centering Sensor	Light path is blocked.
PRSS	Pressure Detection Sensor	Light path is blocked.
INK	Ink Sensor	Ink is not detected.
FLOW	Overflow Sensor	Ink is not detected.
DRMA	Position A Sensor	Light path is blocked.
DRMC	Position C Sensor	Light path is blocked.
P-UP	Elevator Upper Limit Sensor	Light path is opened (actuator pressed).
MSEN	Master Sensor	Reflected light (Master) detected.
CSEN	Master Loading Sensor	Reflected light (Master) detected.
MEND	Master End Sensor	Reflected light (Master) detected.
MDTC	Master Detection Sensor	Reflected light (Master) not detected.
MJAM	Master Removal Sensor	Light path is blocked. (Master detected.)
PTLS	Paper Size Detection Sensor	Reflected light detected. (Paper detected.)
WAIT	Master Positioning Sensor	Reflected light (Master) not detected.
PSEN	Paper Sensor	Light path is blocked. (Paper detected.)
RCV1	Paper Receiving Sensor 1	Light path is blocked. (Paper detected.)
RCV2	Paper Receiving Sensor 2	Light path is blocked. (Paper detected.)
P-IN	Paper Feed Detection Sensor	Light path is blocked. (Paper detected.)
PRP	Pressure Control Sensor	Light path is opened.

TP

TP1 (GND2)	Ground for 24V lines.
TP2 (GND2)	Ground for 24V lines.
TP3 (GND1)	Ground for 5V lines.
TP4 (GND2)	Ground for 5V lines.

BATTERY

CR2450	1 piece

No PC Data Available

6. System PCB

No PC Data Available

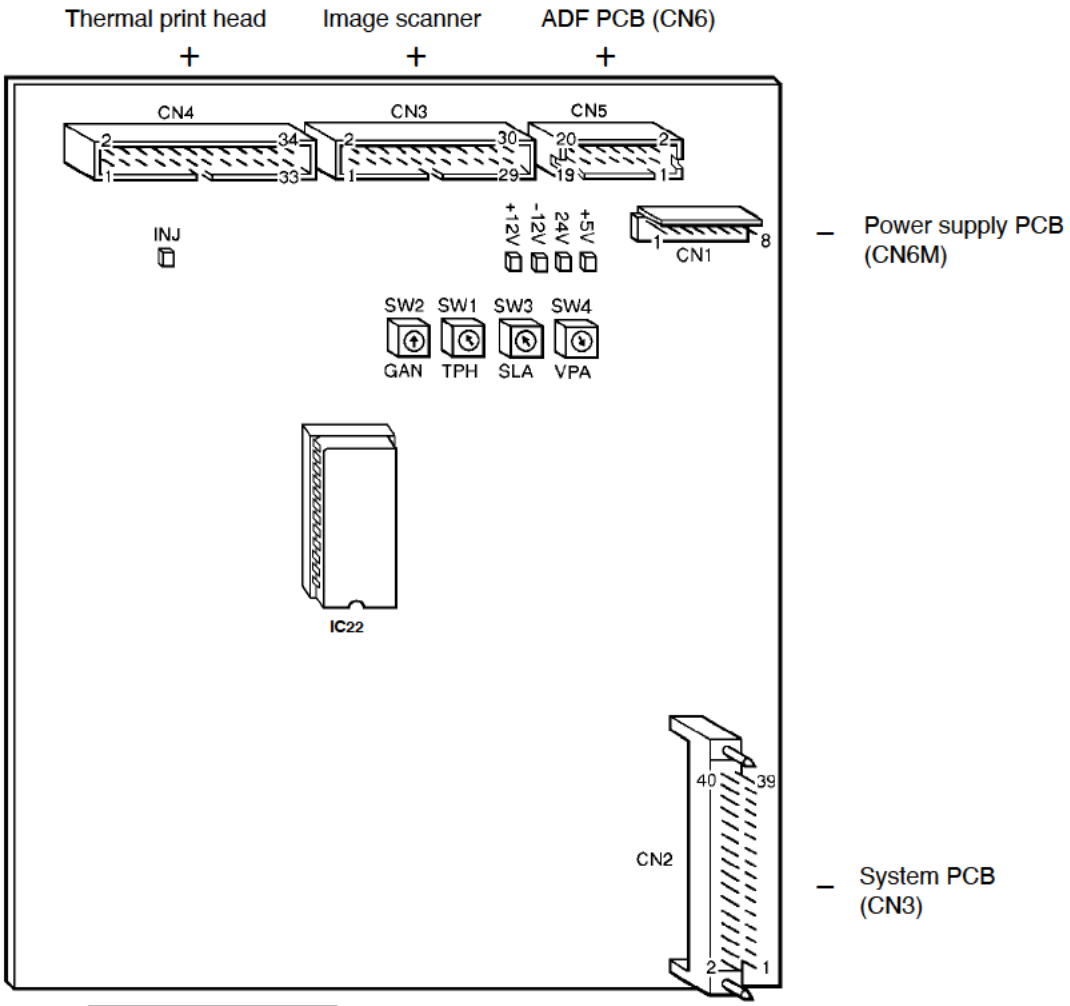
No PC Data Available

6. System PCB

No PC Data Available

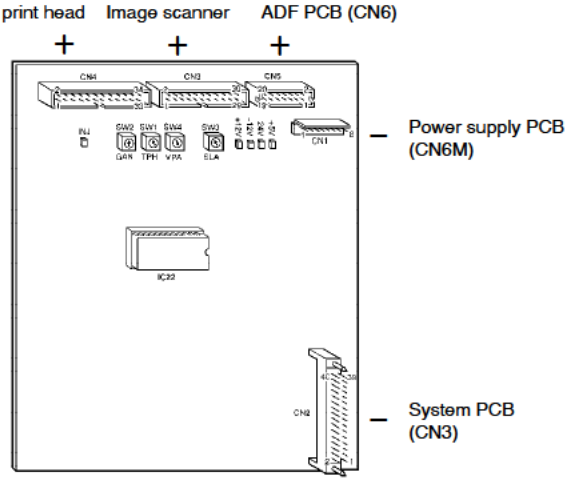
No PC Data Available

7. Image Processing PCB (RA4200)



New type PCB

Old type PCB



SW

SW1 (TPH) : For adjustment of heating power of Thermal print head
SW2 (GAN) : For Gamma (γ) compensation, i.e. contrast balance adjustment in image scanning
SW3 (SLA) : For image elongation/shrinkage correction in image scanning
SW4 (VPA) : Not Used

LED **- When LED is ON -**

+ 5V : + 5V is supplied to PCB.
+24V : + 24V is supplied to PCB.
- 12V : - 12V is supplied to PCB.
+12V : + 12V is supplied to PCB.
INJ : "Read/Write Start Signal" is output.

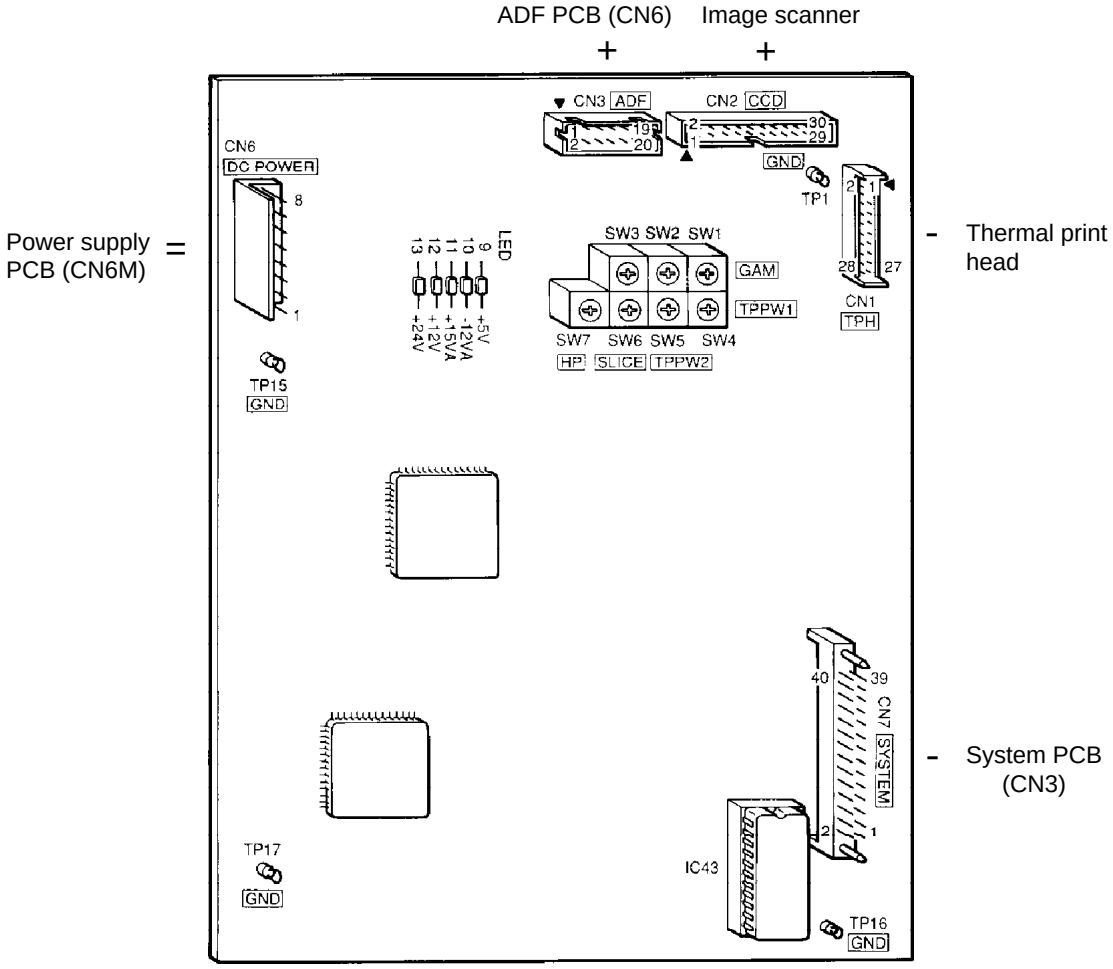
TP

TP 1 (GND) : GND
TP15 (GND) : GND
TP16 (GND) : GND
TP17 (GND) : GND

7. Image Processing PCB (RA4200)

No PC Data Available

8. Image Processing PCB (RA4900)



SW

SW1 (GAM)	:	Gamma (γ) compensation for contrast balance adjustment in image scanning
SW2	:	Not used
SW3	:	For image elongation/shrinkage correction in image scanning
SW4 (TPPW1)	:	For adjustment of heating power of Thermal print head
SW5 (TPPW2)	:	For adjustment of heating power of Thermal print head
SW6 (SLICE)	:	For adjustment of "Line-copy mode" slice level
SW7 (HP)	:	For fine adjustment of Paper size potentiometer

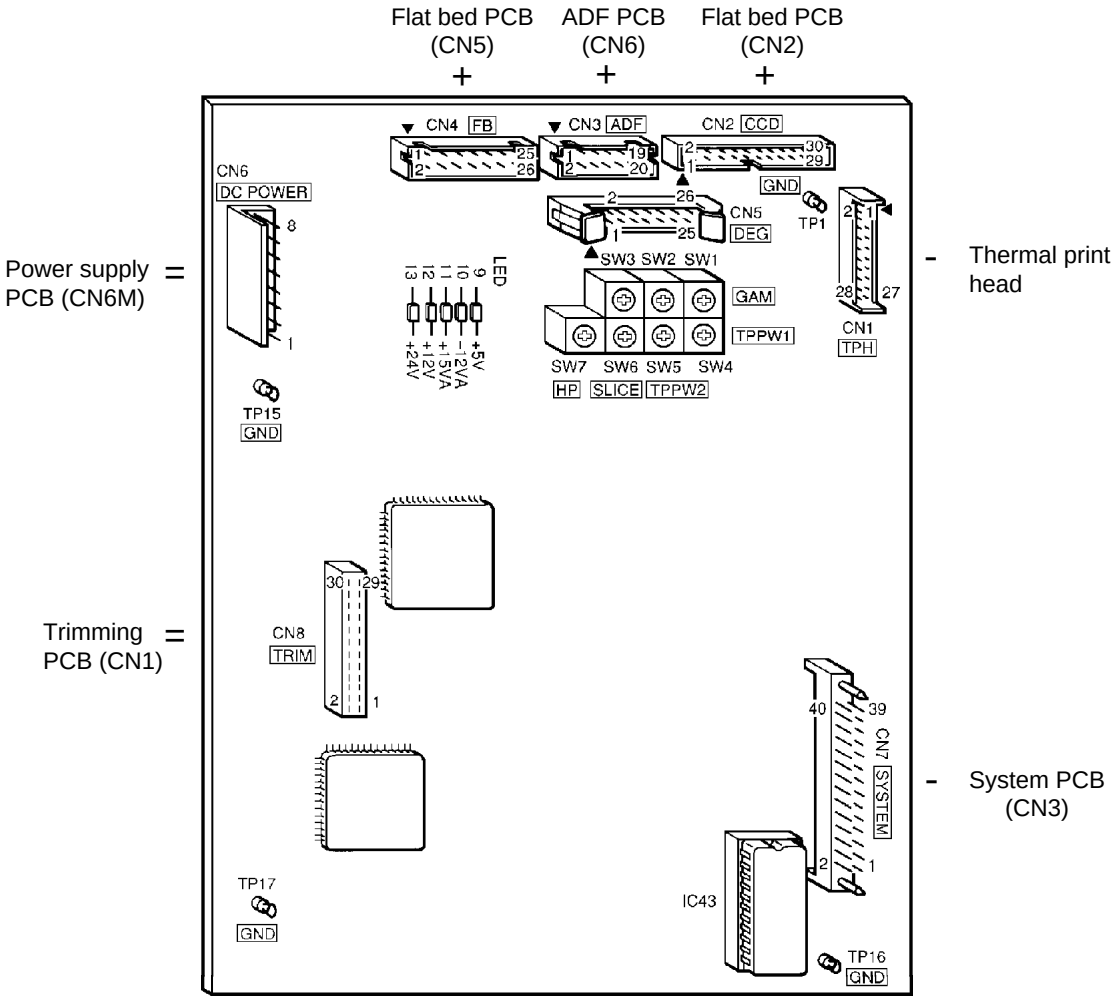
LED **- When LED is ON -**

LED 9 (+ 5V)	:	+ 5V is supplied to PCB.
LED10 (-12VA)	:	-12V is supplied to PCB.
LED11 (+15VA)	:	+15V is supplied to PCB.
LED12 (+12V)	:	+12V is supplied to PCB.
LED13 (+24V)	:	+24V is supplied to PCB.

TP

TP1 (GND)	:	GND
TP15 (GND)	:	GND
TP16 (GND)	:	GND
TP17 (GND)	:	GND

9. Image Processing PCB (RA5900)



SW

SW1 (GAM)	:	Gamma (γ) compensation for contrast balance adjustment in image scanning
SW2	:	For image elongation/shrinkage correction in image scanning (Flat bed)
SW3	:	For image elongation/shrinkage correction in image scanning (ADF)
SW4 (TPPW1)	:	For adjustment of heating power of Thermal print head
SW5 (TPPW2)	:	For adjustment of heating power of Thermal print head
SW6 (SLICE)	:	For adjustment of "Line-copy mode" slice level
SW7 (HP)	:	For fine adjustment of Paper size potentiometer

LED **- When LED is ON -**

LED 9 (+ 5V)	:	+ 5V is supplied to PCB.
LED10 (-12VA)	:	-12V is supplied to PCB.
LED11 (+15VA)	:	+15V is supplied to PCB.
LED12 (+12V)	:	+12V is supplied to PCB.
LED13 (+24V)	:	+24V is supplied to PCB.

TP

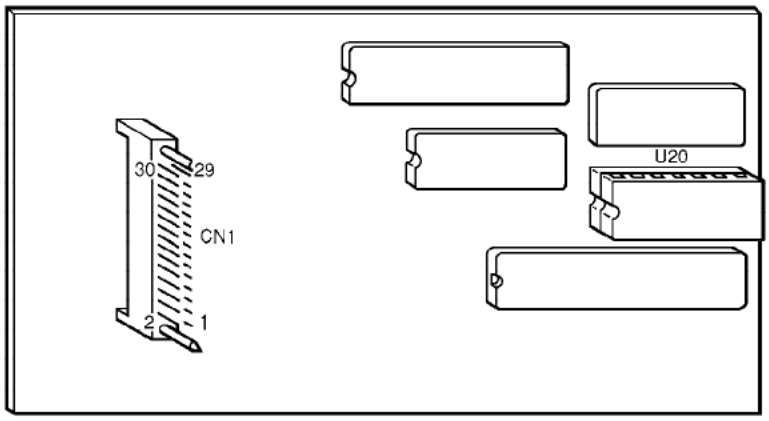
TP1 (GND)	:	GND
TP15 (GND)	:	GND
TP16 (GND)	:	GND
TP17 (GND)	:	GND

9. Image Processing PCB (RA5900)

No PC Data Available

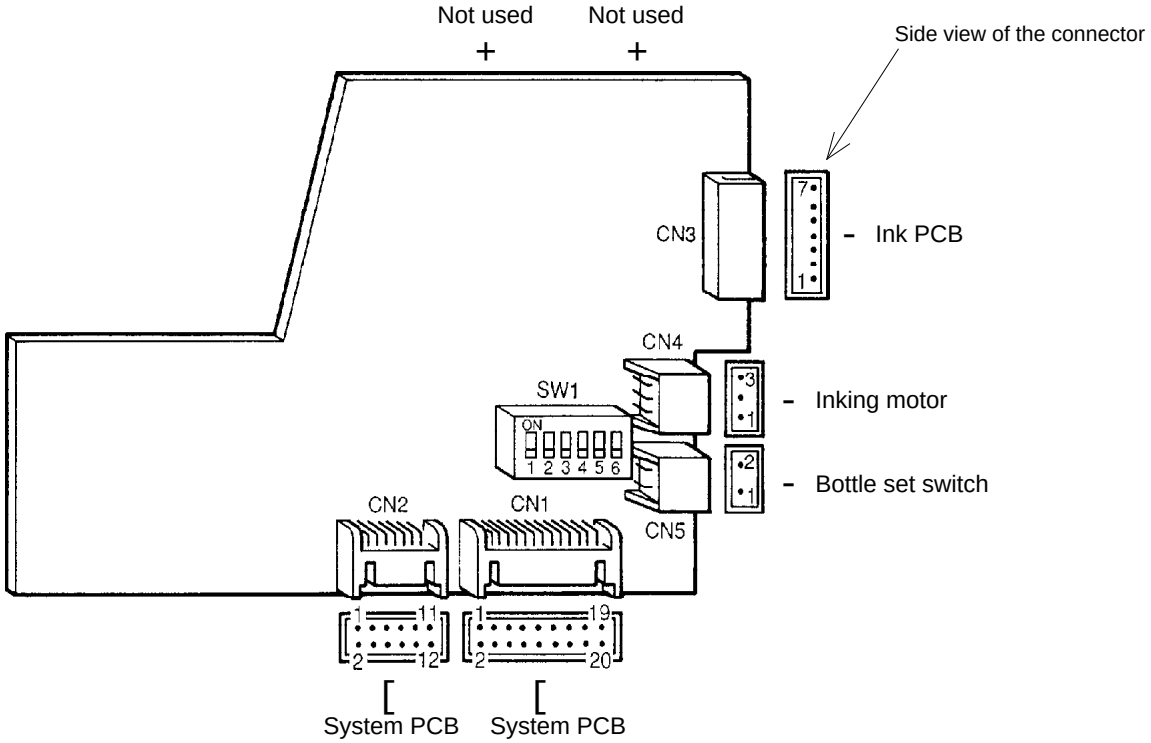
10.Trimming PCB (RA5900)

Image processing PCB (RA5900) (CN8) =



No PC Data Available

11.Drum Control PCB



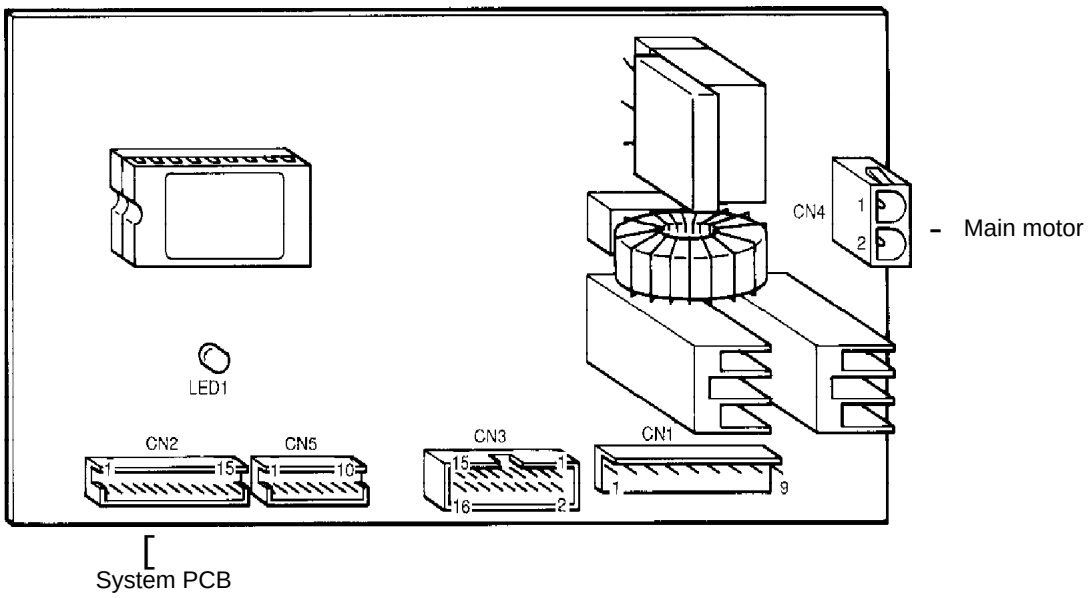
SW

SW1 : Drum Data

DATA	SW	SETTING		
Drum General Data		**STD**		
	1	OFF		
	2	OFF		
Drum Size Data		**B4**	**A4**	**Legal**
	3	OFF	OFF	ON
	4	OFF	ON	OFF
Ink Data		**Black**		**Color**
	5	OFF		ON
	6	OFF		OFF

No PC Data Available

12. Motor Control PCB

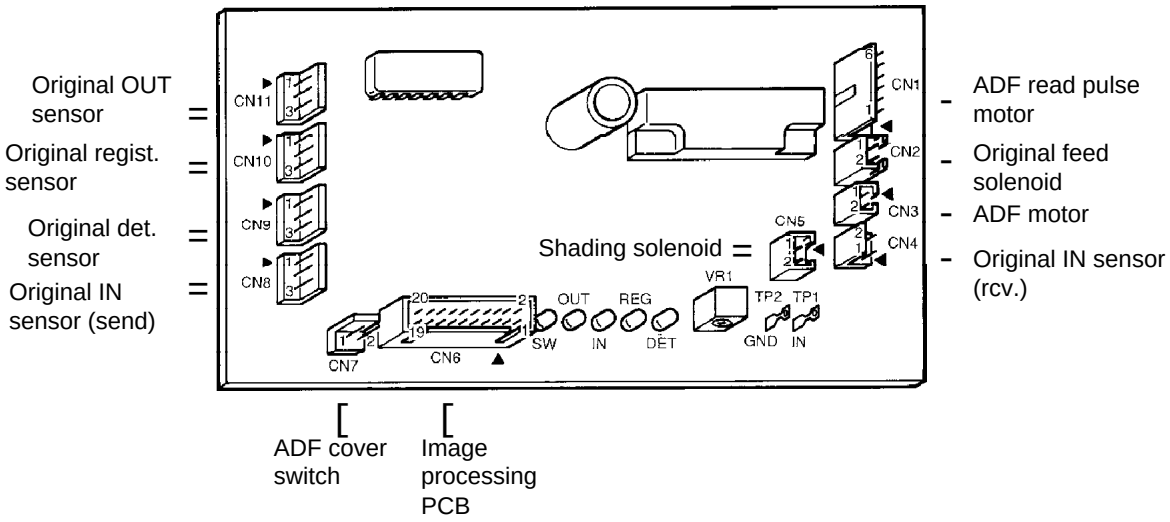


LED **- When LED is ON -**

LED 1: The actuator of Elevator upper limit sensor is raised to open the light path.

No PC Data Available

13. ADF PCB



VR

VR1 : For sensitivity adjustment of Original IN sensor (receive)

LED **- When LED is ON -**

D4 (DET) : The actuator of Original detection sensor is raised to open the light path.
D5 (REG) : The actuator of Original registration sensor is raised to open the light path.
D6 (IN) : The light path of the Original IN sensor is blocked.
D7 (OUT) : The actuator of Original OUT sensor is raised to open the light path.
D8 (SW) : The ADF cover switch is pressed.

Note: LED's, "D4, D5, D7, and D8" are omitted from new ADF PCB, i.e. 017-51000-100. Only "D6 (IN)" is found on the new ADF PCB.

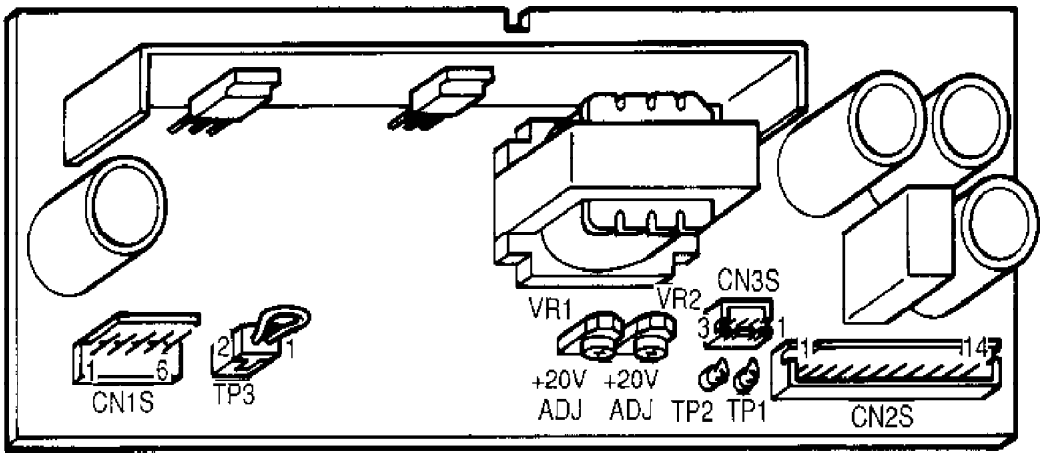
TP

TP1(IN) : For sensitivity adjustment of Original IN sensor
TP2 (GND) : For sensitivity adjustment of Original IN sensor

No PC Data Available

13. ADF PCB

14. TPH Power PCB



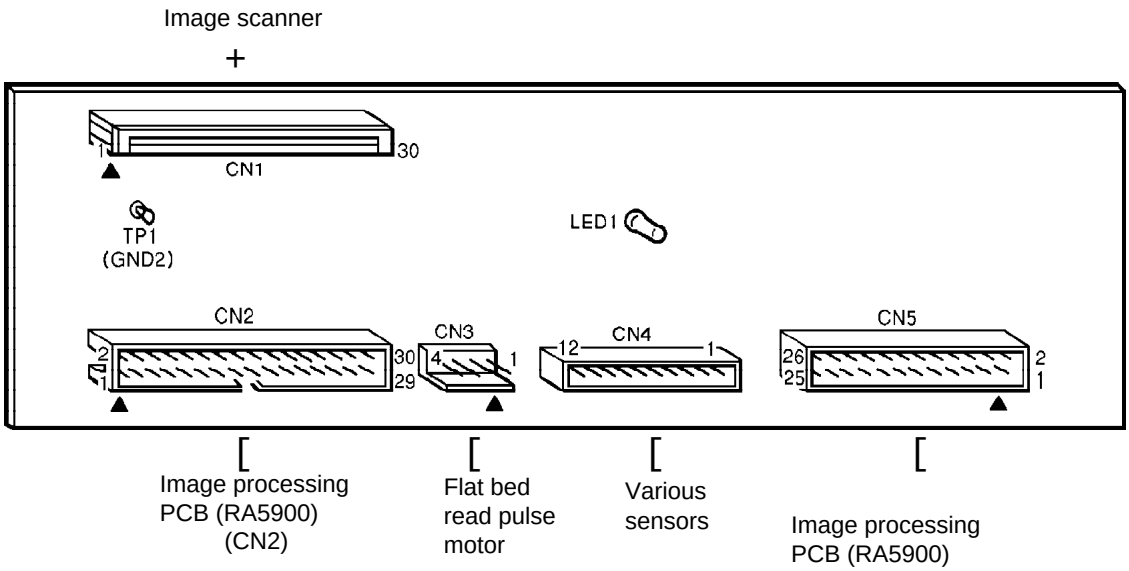
TP

TP1 : +20±3V
TP2 : GND
TP3 : TPH Input Voltage (disconnected when adjusting TPH power).

14. TPH Power PCB

No PC Data Available

15. Flat Bed PCB (RA5900)



LED **- When LED is ON -**

LED 1 : The Flat bed original detection senosr is detecting an original. (The sensor is detecting the reflected light)

TP

TP1 : GND 2

15. Flat Bed PCB (RA5900)

1. Test Mode <GR>

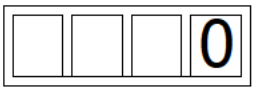
1. Operational Procedures

The Test mode program enables a service technician to check the operation of each electrical component in the machine.

1. **[Starting Up Test mode]**
   Turn on the power, pressing down both the **"LINE/PHOTO"** and **"M/P"** buttons on the main panel. If the Test mode is activated, the following indication will be displayed in the print quantity display.

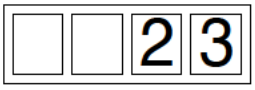
   - This is a sample of the initial condition of Test mode:

   TEST MODE
   Ver 1.23 SYSTEM
   4.56 PANEL

2. **[Checking the Operation of a Component]**
   To check the operation of a component, select a test No. using panel keys.

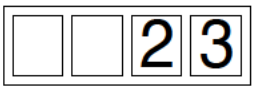
   TEST MODE
   Ver 1.23 SYSTEM
   4.56 PANEL

   (Example: No. **23**)

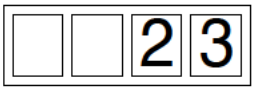
   To activate the selected test, press the **"START"** button.

   TEST MODE
   - TESTING -

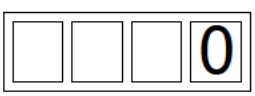
   To stop the test, press the **"START"** button again.

   TEST MODE
   Ver 1.23 SYSTEM
   4.56 PANEL

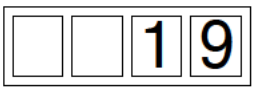
   

3. **[Selecting Another Test mode]**
   To select another Test mode, clear the set Test No. by pressing the **"C"** or **"STOP"** button and select another Test No..

   TEST MODE
   Ver 1.23 SYSTEM
   4.56 PANEL

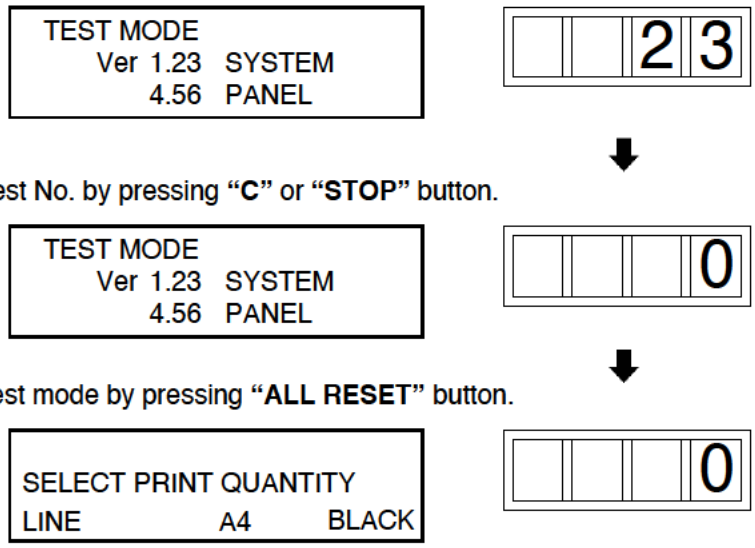
   TEST MODE
   Ver 1.23 SYSTEM
   4.56 PANEL

   (Example: No. **19**)

4. [Exiting from the Test mode]

To exit from a Test mode, clear the set Test No. by pressing the **"C"** or **"STOP"** button and then press the **"ALL RESET"** button.



[Note]

As for the operation procedures of the Test mode in GR2710, GR1750 and GR1700, refer to the pages APX (I)-1 and APX (I)-2.

2. Test Items and Operations

1) Sensor/SW Test

A beep sounds in two ways to tell the current condition.

Detection: 0.1 second interval beep
No detection: 0.5 second interval beep

No	Test Component	Detection Status	3750	2750	2710	1750	1700
1							
2	Paper size sensor	Reflected light is detected.	O	O	O	O	X
3	Elevator lower limit sensor	Light path is blocked.	O	O	O	O	O
4	Paper feed pressure switch	The switch is released.	O	O	O	O	O
5	Master loading button	The button is pressed.	O	O	O	O	O
6	Paper sensor	Light path is blocked.	O	O	O	O	O
7	Pressure detection sensor	Light path is blocked.	O	O	O	O	O
8	Position A sensor	Light path is blocked.	O	O	O	O	O
9	0° Angular sensor	Magnetism is detected.	O	O	O	O	O
10	180° Angular sensor	Magnetism is detected.	O	O	O	O	O
11	Position C sensor	Light path is blocked.	O	O	O	O	O
12	Feed-tray down button	The button is pressed.	O	O	O	O	O
13	Clamp safety switch	The switch is pressed.	O	O	O	O	O
14	Master removal hook sensor	Light path is blocked.	O	O	O	O	O
15	Master positioning sensor	Reflected light is detected.	O	O	O	O	O
16	Drum home position button	The button is pressed.	O	O	O	O	O
17							
18	Drum set switch	The switch is pressed.	O	O	O	O	O
19	Paper receiving sensor 1	Light path is blocked.	O	O	O	O	O
20	Paper receiving sensor 2	Light path is blocked.	O	O	O	O	O
21	Scanner table (Upper cover) set switch	The switch is pressed.	O	O	O	O	O
22	Vertical centering sensor	Light path is blocked.	O	O	O	O	O
23	Master end sensor	No reflected light.	O	O	O	O	O
24	Paper feed clutch sensor	Light path is blocked.	O	O	O	O	O
25	Paper feed det. sensor	Light path is blocked.	O	O	O	O	O
26	Jump wing switch 1	The switch is pressed.	O	O	O	O	X
27	Jump wing switch 2	The switch is pressed.	O	O	O	O	O
28	Master removal sensor	Light path is blocked.	O	O	O	O	O
29	Master loading unit switch	The switch is pressed.	O	O	O	O	O
30	Front cover set sensor	Metal plate is attached.	O	O	O	O	O

NOTE: The status of the Elevator upper limit sensor can be checked by LED on the System PCB and Motor control PCB.
- The LED lights up when the actuator is pressed and the light path of the sensor is NOT blocked.

The status of the Paper detection sensor can be checked by LED on the System PCB.
- The LED lights up when the paper is detected and the sensor light is reflected back.

1) Sensor/SW Test

A beep sounds in two ways to tell the current condition.

Detection: 0.1 second interval beep
No detection: 0.5 second interval beep

No	Test Component	Detection Status	3750	2750	2710	1750	1700
31	TPH home position switch	The switch is pressed.	○	○	○	○	○
32	TPH pressure switch	The switch is pressed.	○	○	○	○	○
33	Disposal box set switch	The switch is pressed.	○	○	○	○	○
34	ADF original detection sensor	Light path is opened.	△	△	△	○	○
35	Original registration sensor	Light path is opened.	△	△	△	○	○
36	Original IN sensor	Light path is blocked.	△	△	△	○	○
37	Ink sensor	Ink is detected.	○	○	○	○	○
38	Overflow sensor	Ink is detected.	○	○	○	○	○
39	Main motor interlock switch	The switch is pressed.	○	○	○	○	○
40	Paper feed safety switch	The switch is released.	○	○	○	○	○
41	Paper feed cassette SW1	Magnetism is detected.	○	○	○	○	○
42	Paper feed cassette SW2	Magnetism is detected.	○	○	○	○	○
43	Paper feed cassette SW3	Magnetism is detected.	○	○	○	○	○
44	Paper feed cassette SW4	Magnetism is detected.	○	○	○	○	○
45	Original OUT sensor	Light path is blocked.	△	△	△	○	○
46	ADF switch	The switch is pressed.	△	△	△	○	○
47	Master detection sensor	Reflected light detected.	○	○	○	○	○
48	Master loading sensor	Reflected light detected.	○	○	○	○	○
49	Scanner home position sensor	Light path is blocked.	○	○	○	×	×
50	Scanner ADF shading sensor	Light path is blocked.	○	○	○	×	×
51	Stage cover sensor	Light path is blocked.	○	○	○	×	×
52	Flat bed original det. sensor	Reflected light detected.	○	○	○	×	×
53	Pressure control sensor	Light path is blocked.	○	○	○	○	○
54	Disposal box master sensor	Light path is blocked.	○	○	○	○	○
55	Bottle set SW1	The switch is pressed.	○	○	○	○	○
56	Bottle set SW2	The switch is pressed.	○	○	○	○	○
57	Bottle set SW3	The switch is pressed.	○	○	○	○	○
58	Battery detection signal	Battery is attached.	○	○	○	○	○
59	Option PCB detection signal	Option PCB is attached.	○	○	○	○	○

NOTE: The status of the Elevator upper limit sensor can be checked by LED on the System PCB and Motor control PCB.
- The LED lights up when the actuator is pressed and the light path of the sensor is NOT blocked.

The status of the Paper detection sensor can be checked by LED on the System PCB.
- The LED lights up when the paper is detected and the sensor light is reflected back.

2) Motor/Solenoid Test

No.	Test Item	No.	Test Item
60	15 rpm Drum rotation	71	Master removal solenoid & Vertical transport motor
61	30 rpm Drum rotation	72	Loading fan
62	Variable speed Drum rotation	73	Clamp solenoid
63		74	Lock solenoid
64	Separation Fan	75	
65	Write pulse motor CW (Feed)	76	Pickup solenoid
66	Loading pulse motor	77	Thermal power control
67	Paper feed clutch	78	Pickup motor
68	Pressure solenoid	79	LED array in Image scanner ON
69	Suction motor (fan)	80	Wing motor (Except for GR1700)
70	Master removal fan		

* Refer to the page on the "Memory Switch" for the Test modes **No.81** through **88**.

3) Memory Clear and Counter Stop, etc.

No.	Test Item
90	**Partial Memory Clear** Certain portion of RAM contents in the System PCB, such as Jam and Trouble messages, will be initialized. (The same operation as when turning the power ON while pressing All Reset button.)
91	**Master Making Width Check** (Except for GR1700)
92	**Prevention of the following operations: master and copy counting, Key/card counter and "T17 CALL SERVICE" or [E17] error signal display (for dead battery)** • In normal operation, the Master count and Copy count signals will not be output, allowing a service technician to print without increasing the digit of the Master and Copy counters. • The machine will be released from this condition when the power is turned off.
97	**All Memory Clear** All RAM contents in the System PCBs, excluding Memory switch settings by Test modes, that is No.81 through 87, will be initialized. Master disposal count is not cleared. **NOTE: This test mode must be done each time System ROM, System PCB, or Battery is changed.**
98	**Memory Switch Clear** Memory switch settings by Test modes No.81 through 87 will be initialized. **This test mode must be done each time System PCB is changed.** **[CAUTION]** **Do not use this test mode in normal operation.** **All the programmed Memory switch settings in the machine will be initialized.**

4) Sequential Operation Test

No.	Test Item
101	**Ink motor operation** While the Drum rotates at the speed of 15 rpm, the Inking motor operates to supply the ink into the Squeegee until the Ink sensor detects ink. Then a blank master is loaded on the Drum and the Auto idling operates for 30 Drum rotations and then stops at the "A" detection (Home) position. • This test mode is used when filling an Inkless Drum with ink.
102	**Elevator motor Up/Down operation** The following operations will be repeated while pressing down the Feed-tray down button. • PRESS ➡ Elevator UP ➡ Upper limit sensor "ON" ➡ Elevator Stop • PRESS ➡ Elevator Down ➡ Lower limit sensor "ON" ➡ Elevator Stop
103	**Print positioning motor CW/CCW rotation (one-cycle check)** Return to vertical center position ➡ One second halt ➡ CW (+) direction rotation ➡ One second halt ➡ CCW (-) direction rotation ➡ One second halt ➡ Return to vertical center position ➡ Stop.
104	**Clamp plate Open/Close operation** (Press START button again to stop) Rotate Drum to Home position ➡ Open Clamp plate (180°) ➡ One second halt ➡ Close Clamp plate (0°) ➡ Rotate Drum to home position (Then go back to the first step).
105	**ADF Original feed operation** (Press START button again to stop) *(Except for GR3750/2750/2710)* Pick-up one original ➡ Shading operation ➡ Feed original ➡ Eject original ➡ Original detection sensor ON ➡ Pick-up one original (Repeats this cycle until START button is pressed.)
106	**Confidential operation (Repeated by three cycles)** Confidential operation ➡ Pressure solenoid ON (one time Drum rotation) ➡ Pressure solenoid OFF (five times Drum rotation). (This is repeated three times and the machine stops.)
107	**Paper feed & Printing operation** (Press START button again to stop) The paper feed tray raises and the paper is continuously fed until paper supply runs out. Note: • The Copy counter does not operate and paper jam is not detected. • Paper feed tray will be automatically lowered without paper. • Ink can be supplied by the Inking motor. • Printing speed key can be operated.

4) Sequential Operation Test

No.	Test Item
108	**Flat bed read pulse motor (scanner) movement** (Press START button again to stop) *(Except for GR1750/1700)* Image scanner home position sensor (2 sec. halt) ➡ Image scanner shading sensor (2 sec. halt) ➡ FB-ADF scanning position (2 sec. halt) ➡ Image scanner home position sensor (2 sec. halt) ・・・ ➡ (This is repeated until START button is pressed.)
109	**Machine aging operation** 130 rpm Drum rotation ➡ 3000 times Magnet A detection ➡ Stop.
110	**Elevator aging operation** UP ➡ Upper limit sensor ON ➡ Stop ➡ DOWN ➡ Lower limit sensor ON ➡ Stop ➡ UP (This cycle is repeated for 5000 times) ➡ Stop.
111	**Thermal pressure motor** If the TPH home position switch is pressed: ・ TPH is lowered ➡ TPH pressure switch is pressed ➡ Stop. If the TPH pressure switch is pressed: ・ TPH is raised ➡ TPH home position switch is pressed ➡ Stop.
112	**Cutter motor ON [One-cut operation]**
113	**FB-ADF Original feed operation** (Press START button again to stop) *(Except for GR1750/1700)* Pick-up one original ➡ Feed original ➡ Eject original ➡ Original detection sensor ON ➡ Pick-up one original (Repeats this cycle until START button is pressed.)
114	**Pressure control motor** Center position ➡ One second halt ➡ Rotates to pressure setting No.12 ➡ Rotates to pressure setting No.1 ➡ Returns to center position (This cycle is repeated three times) ➡ Stop.
115	**Ink Thermistor check** Ink thermistor is defective if "00" or "FF" is shown on the display. All other numbers indicate the thermistor is in good condition. * Displayed number is not the temperature.

4) Sequential Operation Test

No.	Test Item
116	**TPH Thermistor check** TPH thermistor is defective if "00" or "FF" is shown on the display. All other numbers indicate the thermistor is in good condition. * Displayed number is not temperature.
117	**Thermal print head check operation 1** Makes a master of test pattern #1 memorized in the Image processing PCB.
118	**Thermal print head check operation 2** Makes a master of test pattern #2 memorized in the Image processing PCB.
119	**Thermal print head check operation 3** *(Except for GR1750/1700)* Makes a master of test pattern #3 memorized in the Image processing PCB.
120	**Thermal print head check operation 4** *(Except for GR1750/1700)* Makes a master of test pattern #4 memorized in the Image processing PCB.
131	**Suction clutch check** The Drum rotates at the speed of 15 rpm. The clutch is activated ON and OFF by the * key on the Operation panel.

2. Memory Switch <GR>

1. Items

The Memory switch settings can be reprogrammed to make fine adjustments in Image scanning and Master making. The Memory switch mode is started up by the same method as with Test mode. Refer to the following pages for a brief operation procedure.
These Memory switch settings are not initialized by Test Mode No.90 or 97.

Caution:

Do not use Test mode No.98 in normal operation.

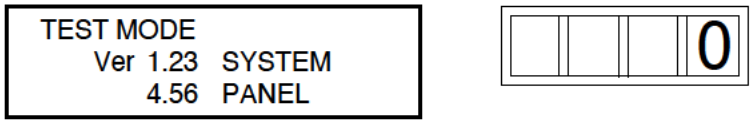
Test mode No.98 initializes all the Memory switch settings to the original "0" setting.

Memory Switch No.	3750	2750	2710	1750	1700
Memory Switch No.81 (Test mode No.81) ····· Refer to page VI-37 [Image Scanner ADF Home Position Adjustment] Adjusts the position of the Image scanner against the White roller (Read roller) to sharpen the blurred image caused by incorrect positioning of the Image scanner.	△	△	△	×	×
Memory Switch No.82 (Test mode No.82) ····· Refer to page VI-32 [Scanning Start Position Adjsutment] When scanning on the Stage glass with the Book processing mode selected.	○	○	○	×	×
Memory Switch No.83 (Test mode No.83) ····· Refer to page V-23 Refer to page VI-36 [Horizontal Scanning Position Adjustment] When using ADF Unit for scanning.	△	△	△	○	○
Memory Switch No.84 (Test mode No.84) ····· Refer to page VI-36 [Horizontal Scanning Position Adjustment] When scanning on the Stage glass.	○	○	○	×	×
Memory Switch No.85 (Test mode No.85) ····· Refer to page VII-17 [Master Making length (Write Pulse Motor Operation Time) Adjustment] Adjusts the master making length by controlling the operation time of the Write pulse motor.	○	○	○	○	○
Memory Switch No.86 (Test mode No.86) ····· Refer to page V-21 Refer to page VI-33 [Scanning Start Position Adjustment] When using ADF Unit for scanning.	△	△	△	○	○
Memory Switch No.87 (Test mode No.87) ····· Refer to page VI-32 [Scanning Start Position Adjustment] When scanning on the Stage glass without selecting the Book processing mode.	○	○	×	×	×
Memory Switch No.88 (Test mode No.88) ··· Refer to page VII-19-GR31 [TPH Thermal Power Adjustment] When the reduction of the thermal power is required.	○	○	○	○	○
Memory Switch No.89 (Test mode No.89) ··· Refer to page III-18-GR19 [Separation Fan Air Power Adjustment] When the air power adjustment of the fan is required.	○	○	○	○	○

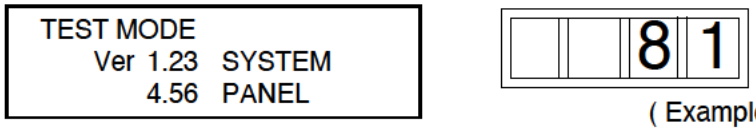
2. Operational Procedures

1. [Starting Up Memory Switch]
Turn on the power, pressing down both the **"LINE/PHOTO"** and **"M/P"** buttons on the main panel.
If the Test mode is activated, the following indication will be displayed in the print quantity display.

- This is a sample of the initial condition of Memory Switch:



2. [Selecting the Memory Switch]
Select a Memory Switch No. using panel keys.



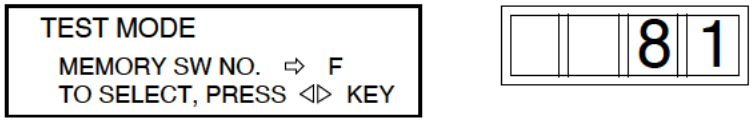
(Example: No. **81**)

To activate the selected Memory SW, press the **"START"** button.

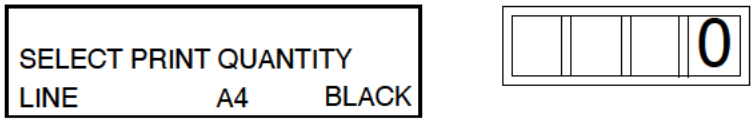
To change the Memory switch setting, press the ◁ or ▷ key of the PRINT POSITION BUTTON to move the number up or down.
The setting can be selected from 16 choices, i.e. 0,1,2,3,4,5,6,7,8,9,A,B,C,D,E or F.

The ▷ key moves the number up.

The ◁ key moves the number down.



To set the machine at the selected switch setting, press the **"START"** button and then **"C"** or **"STOP"** button and then **"ALL RESET"** button to exit from the Memory Switch adjustment.
The machine then returns to the normal working condition.



[Note]
As for the operation procedures of the Memory switch in GR2710, GR1750 and GR1700, refer to the pages APX (I)-1 and APX (I)-2.

3. Users Mode <GR>

1. Initial Operation Settings

The users mode program enables a machine operator to select the initial operation settings of the machine.
This mode is explained in "User Guide" and is intended for customers to make a selection if required.

[INITIAL SETTINGS OPEN TO CHANGES] — The initial settings (at factory shipment) are in boldface in the chart below.

Item No.	Item TItle	Description	Choices	3750	2750	2710	1750	1700
01	Print Speed	Selects the initial print speed (copies per minute).	60/80/**100**/110/120	○	×	×	×	×
			60/80/**100**/120/130	×	○	○	○	○
02	Auto Print Feature	Selects the initial status of the Auto print feature.	**OFF** / ON	○	○	○	○	○
03	Jump Wing Setting	Activates/Deactivates the Jump wings at paper exit.	**AUTO** / OFF	○	○	○	○	×
04	Displayed Print Quantity	Selects the initial number appearing in the Print quantity display.	**0000** / 0001	○	○	○	○	○
05	Master Making Area Limit	Selects the maximum image area for a master sheet.	**VARIABLE** / A3 / B4 / A4	○	○	○	○	×
06	Auto Reset Time	Gives/Ignores the period for automatic initialization.	**NONE** / 5 Minutes	○	○	○	○	○
07	Minimum Print Quantity	Selects the minimum print quantity which should be produced from one master.	**1** / 10 / 20 / 30	○	○	○	○	○
08	Auto Idle Period	Selects the period required for automatic activation of the Auto idle feature.	**12 HRS** / 6HRS / OFF (No limit)	○	○	○	○	○
09	Auto Document Feed	Requires the Start key or Not, to feed the following original placed in the ADF unit without the Auto print feature activated.	**OFF (Start key required)** ON (Start key not required)	○	○	○	○	○
11	Two-Up Time Interval	Gives/Ignores the interval required for replacing the original on the Stage glass for Two-up printing.	**NONE (No interval)** / 15 SEC.	○	○	○	×	×
12	Two-Up Formation	Selects the size of the original available for Two-up printing in ADF.	**B5 x 2** / A5 x 2	×	×	×	○	○
13	Job Separator Connection	Open/Closes the data line for the Job separator. Select "YES" when attaching the Job separator.	**NO (Close data line)** / YES (Open data line)	○	○	○	○	○
17	Displayed Language	Selects a displayed language.	**English** and other 8 languages (The detail will be given later by bulletins.)	○	○	×	×	×

Refer to the following pages for the procedures of changing the initial operation settings.

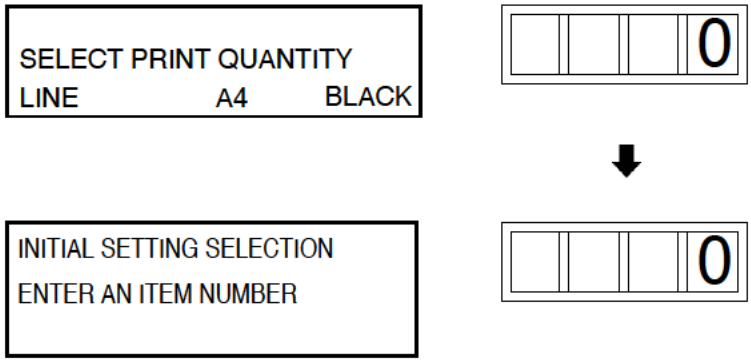
[Note]

As for the operation procedures in GR2710, GR1750 and GR1700, refer to the pages APX (I)-10.

2. Operational Procedure

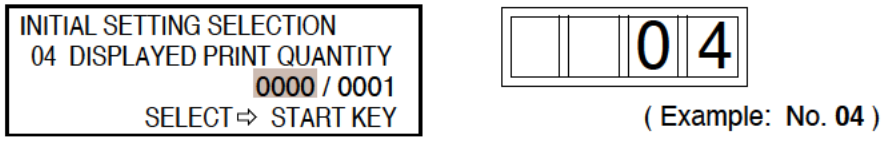
1. [Starting Up Users Mode]

Turn ON the power.
Press **8** key of the print quantity keys while pressing down the ★ key.
This makes access to the User mode.



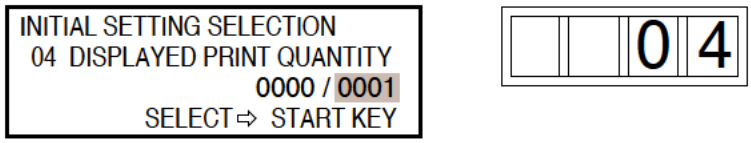
2. [Making Selections]

After the access is made, select the item(s) whose initial setting is required to be changed.
Use the print quantity keys to select the desired item number.
For example, choose the item **04**.

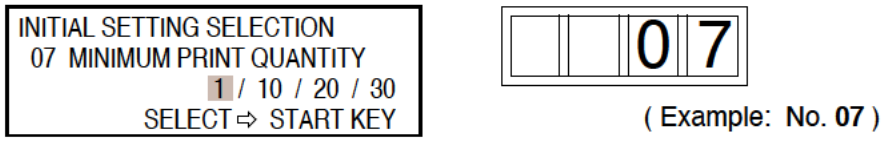


(Example: No. **04**)

Press "START" key to select the desired print quantity which is displayed at power-on.
The shaded area is where the selection is made.

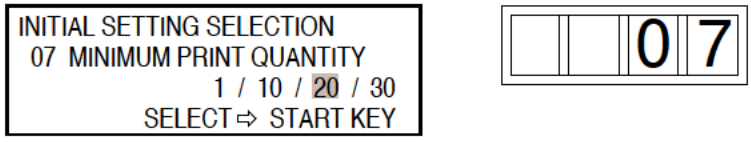


If another change needs to be made, continue the selection by pressing the print quantity key.
The display will automatically change to the next selected display.
For example, press **07**.

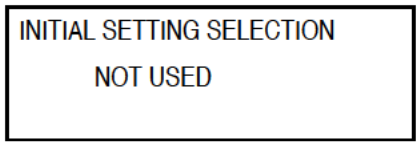


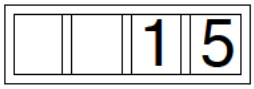
(Example: No. **07**)

Press "START" key to select the desired print quantity.
The shaded area is where the selection is made.



If a nonexisting item number is selected, the following message will be displayed as shown below.
In this case, reselect an existing item number.

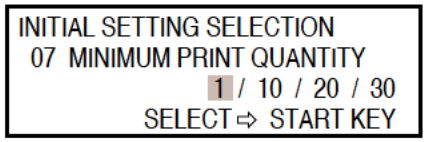


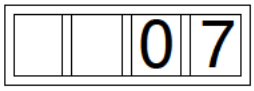


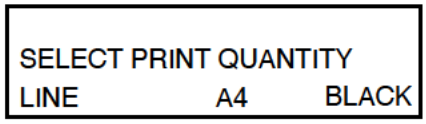
(Example: No. **15**)

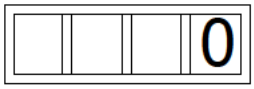
Repeat the procedure until all required changes are made.

To exit from this mode, press the "ALL RESET" key for 1 second.
All new initial settings are memorized and the dispaly returns to the normal condition.





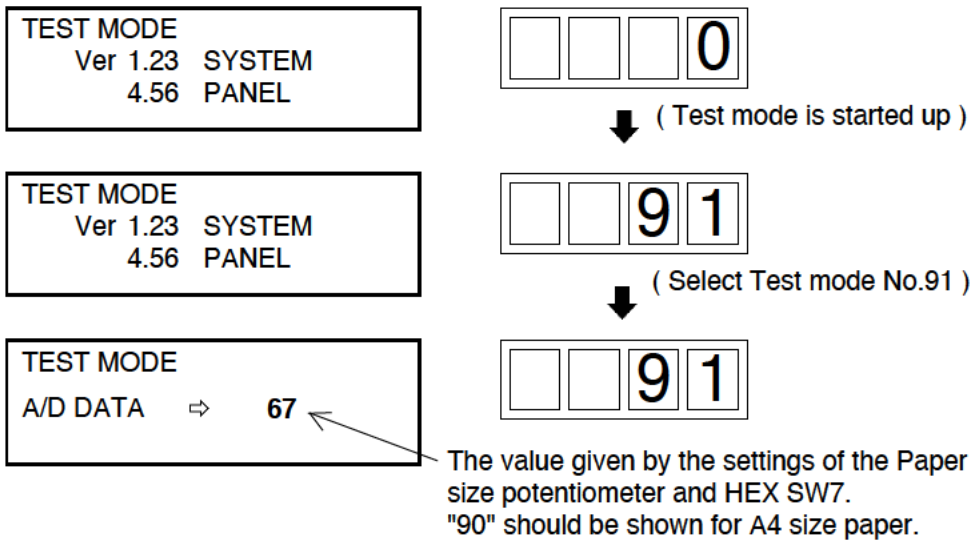




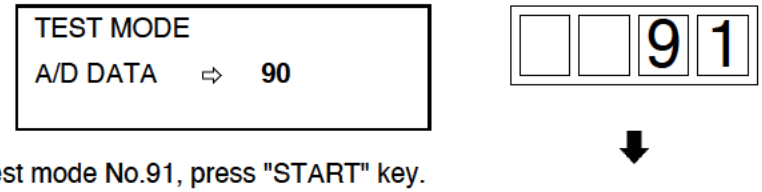
4. Master Making Width Adjustment <GR>

1. To check whether the Paper size potentiomenter is adjusted to the correct setting, place A4 size or B4 size paper on the Paper feed tray and slide the Paper guides against it.
2. Start up Test mode No.91 and press **"START"** key.
   A certain number, which is the value given by the settings of the Paper size potentiometer and HEX SW7 on the Image processing PCB, will appear aside "A/D DATA" in the Main LCD display for GR3750 and GR2750 or in the print quantity display for GR2750 and GR1750.

   "**90**" should be shown in the display with A4 size paper and "**63**" with B4 size one..



3. If a different number is shown, turn the HEX SW7 until "**90**" appears in the display.



4. To exit from Test mode No.91, press "START" key.
   The display on the Panel returns to the initial condition.

- Note -

- The actual width of master making will be 2mm narrower on each side, compared to the original.
- Turning SW7 to a larger number will increase the Master making width.
  Turning it to a smaller number will decrease the width.
- One notch of SW7 will change the Master making width by 1mm.

Paper size	Correct value
A3 (297mm)	3C
B4 (257mm)	63
A4 (210mm)	90
B5 (181mm)	Ad
A5 (148mm)	Cd

5. Advice Displays <GR>

1. "CALL SERVICE" indication

T1
CALL SERVICE

E 01

- Main Motor Lock -

Displayed to interrupt the machine operation:

1) If the Drum position A is still detected by the Position A detection sensor **2 seconds** after the Main motor started.
2) If the Drum position A hasn't been detected by the Position A detection sensor within **5 seconds** after the Main motor is started.

T2
CALL SERVICE

E 02

- Elevator Motor Lock -

Displayed to interrupt the machine operation:

1) If the actuator of the Elevator upper limit sensor is not raised within **9 seconds** after the Elevator motor started to raise the Paper feed tray.
2) If the light path of the Elevator lower limit sensor is not blocked within **9 seconds** after the Elevator motor started to lower the Paper feed tray.
3) If the light path of the Elevator lower limit sensor is blocked **2 seconds** after the Elevator motor started to raise the Paper feed tray.
4) If the actuator of the Elevator upper limit sensor is still raised **2 seconds** after the Elevator motor started to lower the Paper feed tray.

T3
CALL SERVICE

E 03

- Clamp Error 1 -

Displayed to interrupt the machine operation:

1) If the actuator of the Clamp safety switch is still depressed **4 seconds** after the Clamp solenoid was activated (turned on).
2) If the actuator of the Clamp safety switch has not been depressed within **4 sec.** after the Clamp solenoid was released (turned off).
3) If the Angular magnet has not been detected by the Angular sensor (either 0° or 180°) within **8 seconds** after the Clamp motor started rotating.
4) If the actuator of the Clamp safety switch is not depressed when the Clamp solenoid is not in operation.

T4
CALL SERVICE

E 04

- Ink Overflow -

Displayed to interrupt the machine operation:

1) If the Overflow sensor detects excessive ink in the Squeegee unit.

T5
CALL SERVICE

E 05

- Print Positioning Motor Lock -

Displayed to interrupt the machine operation:

1) If the Vertical centering sensor status has not been changed from ON to OFF (or OFF to ON) within **12 seconds** after the Print positioning motor started rotating.

T6
CALL SERVICE

E 06

- Pressure Detection Sensor Malfunction -

Displayed to interrupt the machine operation:

1) If the Pressure detection sensor status has not been changed from ON to OFF (or OFF to ON) within **8 seconds** after the Main motor started rotating.

T7
TURN MAIN POWER
SW. OFF THEN ON

< Only in GR3750/2750 >

- Communication error between GR and Digitizer -

Displayed to interrupt the machine operation:

1) If a communication error has occurred between the CPU and the digitizer.

T8
TURN MAIN POWER
SW. OFF THEN ON

E 08

- Communication error between GR and Interface Accessaries -

Displayed to interrupt the machine operation:

1) If a communication error has occurred between the CPU and the interface accessaries.

T9
TURN MAIN POWER
SW. OFF THEN ON

E 09

- Communication error between GR and the Sorters -

Displayed to interrupt the machine operation:

1) If a communication error has occurred between the CPU and the sorters.

T10
TURN MAIN POWER
SW. OFF THEN ON

< Only in GR3750/2750 >

- Malfunction of Trimming PCB or Image Processing PCB -

Displayed to interrupt the machine operation:

1) If data signals such as original size, are not output from the **Trimming PCB** at the start of the image scanning operation.
2) If Auto base cntrol signal is not output from the **Image processing PCB**.

T11
CALL SERVICE

E 11

- Pressure Control Motor Lock -

Displayed to interrupt the machine operation:

1) If the pulse from the Encoder disc on the Pressure control motor has not been detected within **100ms** from the start of the Pressure control motor.
2) If the Pressure centering sensor status has not been changed from ON to OFF (or OFF to ON) within **5 seconds** from the start of the Pressure control motor.

T13
CALL SERVICE

E 13

- Cutter Motor Lock -

Displayed to interrupt the machine operation in master-making and confidential process:

1) If master is detected by the Master positioning sensor at Drum A position after the cutting operation and besides it is still detected by the Master positioning sensor at the next Drum A position detection after the second cutting operation.

T14
CALL SERVICE

E 14

- Clamp Error 2 -

Displayed to interrupt the machine operation:

1) If the actuator of the Clamp safety switch is not depressed when the Clamp solenoid is not in operation.

T15
CALL SERVICE

E 15

< Only in GR3750/2750/2710 >

- Flat Bed Read Pulse Motor Lock -

Displayed to interrupt the machine operation:

1) If the Image scanner home position sensor does not detect the Image scanner within **18898 pulses** after the Flat bed read pulse motor is activated.
2) If the Image scanner ADF Shading sensor does not detect the Image scanner within **15748 pulses** after the Flat bed read pulse motor is activated.
3) If the Image scanner is not release from the Image scanner home position sensor within **314 pulses** after the Flat bed read pulse motor is activated.
4) If the Image scanner is not released from the Image scanner ADF Shading sensor within **314 pulses** after the Flat bed read pulse motor is activated.

T16
CALL SERVICE

E 16

- Position C Sensor Malfunction -

Displayed to interrupt the machine operation:

1) If the Position C sensor status has not been changed from ON to OFF (or OFF to ON) within **8 seconds** from the start of the Main Motor.

T17
CALL SERVICE
REPLACE BATTERY

E 17

- Replace Battery -

Displayed to interrupt the machine operation:

1) If the Battery detection signal is OFF at either of following three cases.
   <1> when the machine power is turned ON <2> when All reset button is pressed <3> at the end of machine operation.

T18
TURN MAIN POWER
SW. OFF THEN ON

E 18

- Sorter Error -

Displayed to interrupt the machine operation:

1) If an error signal is received from the sorter.

T19
CALL SERVICE

E 19

- Thermal Pressure Motor Lock -

Displayed to interrupt the machine operation:

1) If the TPH Pressure switch has not been depressed within **4 seconds** after the TPH Pressure motor was activated to lower the TPH.
2) If the TPH Pressure switch has not been released within **4 seconds** after the TPH Pressure motor was activated to raise the TPH.

T20
CALL SERVICE

E 20

< Except for GR1700>

- Wing Motor Lock -

Displayed to interrupt the machine operation:

1) If neither of the Jump wing sw1 or sw2 has been depressed within **5 seconds** after the Wing motor was activated.
2) If neither of the Jump wing sw1 or sw2 has been released within **5 seconds** after the Wing motor was activated.

Note: The "C" messages in parentheses, e.g. (C 21), are displayed only when the * key is pressed on the Operation panel.

CLAMP ERROR
REMOVE MASTER
ROLL THEN RE-
INSTALL

(C 21)

- Master Loading Error (onto the Drum) -

Displayed to interrupt the machine operation:

1) If the Master load sensor does not detect master at the Drum C-1 position during loading of the master on the Drum.

MASTER MIS-FEED
REMOVE MASTER
ROLL THEN RE-
INSTALL

(C 22)

- Master Mis-Feed -

Displayed after the master has been loaded onto the Drum in the master making or confidential process:

1) If the Master positioning sensor has not detected master material within **787 pulses** (**536 pulses** in confidential process) after the Loading pulse motor started following the master cutting operation.

Displayed to interrupt the machine operation when the Master loading button was pressed:

1) If the Master positioning sensor has not detected master material within **1260 pulses** after the Loading pulse motor was turned on.
2) If the Master positioning sensor has not detected master material within **787 pulses** after the Loading pulse motor was turned on following the operation of the Cutter motor and the cut master material is removed.

MASTER CUT ERROR
REMOVE DRUM (PRINT
CYLINDER) AND
CHECK MASTER

(C 23)

- Master Cut Malfunction -

Displayed to interrupt the machine operation in master-making and confidential process:

1) If master is detected by the Master positioning sensor at Drum A position after the cutting operation and besides it is not detected by the Master positioning sensor at the next Drum A position detection after the second cutting operation.

REMOVE
CUT MASTER STRIP

C 24

- A Cut Piece of Master Remains inside the Machine -

Displayed:

1) If the Master positioning sensor detects master material (the reflected light) just after the master cut operation is completed.

DISPOSAL ERROR
REMOVE DRUM (PRINT
CYLINDER) AND
DISCARD MASTER

(C 25)

- Master Removal Error -

Displayed after the Image scanning and Master making operations are completed or in the confidential operation:

1) If the Master removal sensor does not detect a removed master while the Drum rotates from C-1 to A position, during master removal operation.
2) If the light path of the Master removal sensor is still blocked by a removed master when the Vertical transport motor stops.

REMOVE
JAMMED MASTER
IN DISPOSAL UNIT

(C 26)

- Removed Master Jammed at the entrance of Master disposal box -

Displayed:

1) If the light path of the Master removal sensor is blocked at the start of master-making operation.

Note: The "C" messages in parentheses, e.g. (C 27), are displayed only when the * key is pressed on the Operation panel.

NO MASTER ON DRUM
(PRINT CYLINDER)
PRESS ALL RESET KEY AND
MAKE A NEW MASTER

(C 27)

No Master on Drum

Displayed to interrupt the machine operation:

1) If the Master sensor does not detect master on the drum at the Drum A position when the printing starts.

PAPER JAM
CHECK PAPER FEED
AREA

(C 31)

Paper Jam in the Second Paper Feed Area

Displayed to interrupt the machine operation:

1) If the Paper sensor malfunctions.
2) If the Paper sensor detects paper when the Pressure detection sensor detects the Pressure disc.
3) If at the Drum A position, the Paper receiving sensor 1 does not detect paper and at the next Drum A position, the Paper sensor detects the paper.

PAPER JAM UNDER
DRUM
PULL OUT DRUM

PAPER JAM
REMOVE PAPER
UNDER PRINT CYLINDER

(C 32)

Paper Jam around Paper Receiving Sensor 1

Displayed to interrupt the machine operation:

1) If the Paper receiving sensor 1 detects paper when the Pressure detection sensor detects the Pressure disc.
2) If the Paper receiving sensor 2 detects paper when the Paper receiving sensor 1 detects the next sheet of paper.

PAPER MISFEED
CHECK PAPER FEED
AREA AND PRESS
ALL RESET KEY

(C 33)

Paper Jam in the First Paper Feed Area

Displayed to interrupt the machine operation:

1) If the Paper sensor has not detected paper while the Position A sensor detects the A position three times.

PAPER JAM ON
DRUM (PRINT CYLINDER)
REMOVE PAPER

(C 34)

Paper Jam under the Drum

Displayed to interrupt the machine operation:

1) If the Paper receive sensor 1 does not detect paper at the Drum A position and the Paper sensor does not detect the paper at the next Drum A position.

ORIGINAL MISFEED
OPEN ADF COVER
AND RESET
ORIGINAL

(C 36)

Original Misfeed

Displayed to interrupt the machine operation:

1) If the actuator of the Registration sensor is not opened within **1.35 seconds** after the Original pickup motor was turned on.

ORIGINAL JAM
RESET ORIGINAL /1

(C 37)

Original Jam at Entrance

Displayed to interrupt the machine operation:

1) If the Original IN sensor has not detected an original within **630 pulses** after the Read pulse motor was turned on.

ADVICE DISPLAYS <GR>

Note: The "C" messages in parentheses, e.g. (C 38), are displayed only when the * key is pressed on the Operation panel.

ORIGINAL JAM
REMOVE ORIGINAL /2

(C 38)

Original Jam or Oversize

Displayed after the master has been loaded onto the Drum:

1) If the light path of the Original IN sensor is blocked for **14,173 pulses** (FB type **= 14,803**) after the Read pulse motor is turned on.

ORIGINAL JAM
RESET ORIGINAL /3

(C 39)

Original Jam at the Exit

Displayed after the master has been loaded onto the Drum:

1) If the Original OUT sensor has been blocked for **1,890 pulses** after the Read pulse motor was turned on.

REPLACE
INK CARTRIDGE

(C 41)

- Replace Ink Cartridge -

Displayed to interrupt the machine operation:

1) If the Ink sensor does not detect ink in the Squeegee unit within **30 seconds** after the Inking motor was started.

REPLACE
MASTER ROLL

(C 42)

- Replace Master Roll -

Displayed to interrupt the machine operation:

1) If the black tape attached at the end of the Master roll has been detected by the Master end sensor during master making or confidential operation.

EMPTY
DISPOSAL BOX

(C 43)

- Empty Disposal Box -

Displayed after the machine operation is finished:

1) If the disposed master is detected 40 times (50 for A4-drum models) by the Master removalsensor after the Disposal box was emptied.

ADD PAPER

(C 44)

- Add Paper -

Displayed to interrupt the machine operation:

1) If the light path of the Paper detection sensor is open.

T50
CALL SERVICE

E 50

- Connect "Copy/Master" Counter -

Displayed to interrupt or prevent machine operation:

1) If the connector of the copy and master counter comes loose or if the counter is removed.

INSERT CARD
IN KEY/CARD
COUNTER

(C 51)

- Insert Card into Key/Card Counter -

Displayed to prevent the machine operation:

1) If an operator card is not set in the Key/Card counter.

SET DRUM
IN PLACE

INSTALL
PRINT CYLINDER

(C 52)

- Set Drum in Place -

Displayed to prevent the machine operation:

1) If the actuator of the Drum set switch is not depressed.

Note: The "C" messages in parentheses, e.g. (C 53), are displayed only when the * key is pressed on the Operation panel.

INSTALL INK CARTRIDGE

(C 53)

- Set Ink Cartridge in Place -

Displayed to prevent the machine operation:

1) If the actuator of the Ink bottle switch is not depressed.

SET LEAD EDGE OF MASTER UNDER GREEN FILM

(C 54)

- Set Leading Edge of Master Under Green Films -

Displayed to prevent the machine operation:

1) If the Master detection sensor does not detect master material (the reflected light).

CLOSE FRONT COVER

(C 55)

- Close Front Cover -

Displayed to prevent the machine operation:

1) If the metal plate is not attached to the Front cover set sensor.

CLOSE SCANNER TABLE

(C 56)

- Close Scanner Table (or Upper Cover) -

Displayed to prevent the machine operation:

1) If the safety switch is not pressed by the Scanner table (or Upper cover).

SET (INSTALL) MASTER DISPOSAL BOX IN PLACE

(C 57)

- Set Master Disposal Box in Place -

Displayed to prevent the machine operation:

1) If the actuator of the Disposal box set switch is not depressed.

CLOSE MASTER LOADING UNIT

(C 58)

- Close Master Loading Unit -

Displayed to prevent the machine operation:

1) If the actuator of the Master loading unit switch is not depressed.

CLOSE ADF COVER

(C 59)

- Close ADF Unit -

Displayed to prevent the machine operation:

1) If the actuator of the ADF unit set switch is not depressed.

CHECK PAPER FEED AREA

C 60

- Paper Feed Tray Emergency Stop -

Displayed to interrupt the machine operation:

1) If the safety switch over or under the Paper feed tray is activated.

WRONG-SIZE DRUM
(PRINT CYLINDER)
INSTALLED

C 61

- Drum Size Error -
Displayed to prevent the machine operation:
1) If a wrong size drum is set in the machine.

WRONG-TYPE DRUM
(PRINT CYLINDER)
INSTALLED

C 62

- Drum Brand Error -
Displayed to prevent the machine operation:
1) If a wrong brand drum is set in the machine.

WRONG-TYPE
INK CARTRIDGE
INSTALLED

C 63

- Ink Cartridge Brand Error -
Displayed to prevent the machine operation:
1) If a wrong type of ink cartridge is set in the machine.

T68
CALL SERVICE

E 68

- "SF3000" Bulk Sheet Feeder Power Malfunction -
Displayed to interrupt the machine operation:
1) If the Bulk sheet feeder encounters power failure.

CLOSE BULK (SHEET)
FEEDER COVER AND
PRESS ALL RESET
KEY

C 69

- "SF3000" Bulk Sheet Feeder Error -
Displayed to interrupt the machine operation:
1) If the Bulk sheet feeder malfunctions.

PAPER JAM IN
SORTER
CHECK SORTER

C 71

- Sorter Error - Paper jammed in Sorter -
Displayed to interrupt the machine operation:
1) If paper has jammed in the sorter.

CLOSE SORTER'S
COVER

C 72

- Sorter Error - Sorter door (or cover) is open -
Displayed to prevent the machine operation:
1) If the door (or cover) of the sorter is open.

PAPER REMAINING
IN SORTER
REMOVE PAPER

C 73

- Sorter Error - Paper remains in Sorter -
Displayed to prevent the machine operation:
1) If the sorted sheets remain in the sort bins.

SORTER BIN FULL
REMOVE PAPER

C 74

- Sorter Error - Sorter bins are full -

Displayed to interrupt the machine operation:

1) If the sort bins are full of sorted sheets.

WRONG PAPER SIZE
SELECTION
CHANGE SELECTION

C 75

- Sorter Error - Wrong paper size is selected -

Displayed to prevent the machine operation:

1) If the paper size selection on the sorter does not match with the size of the paper loaded on the Paper feed tray.

THIS SIZE OF
PAPER IS
NOT ACCEPTABLE
FOR SORTER

C 76

- Sorter Error - Unavailable paper size -

Displayed to prevent the machine operation:

1) If the size of the paper loaded on the Paper feed tray is out of the range of paper size which can be used in the sorter.

T78
CALL SERVICE

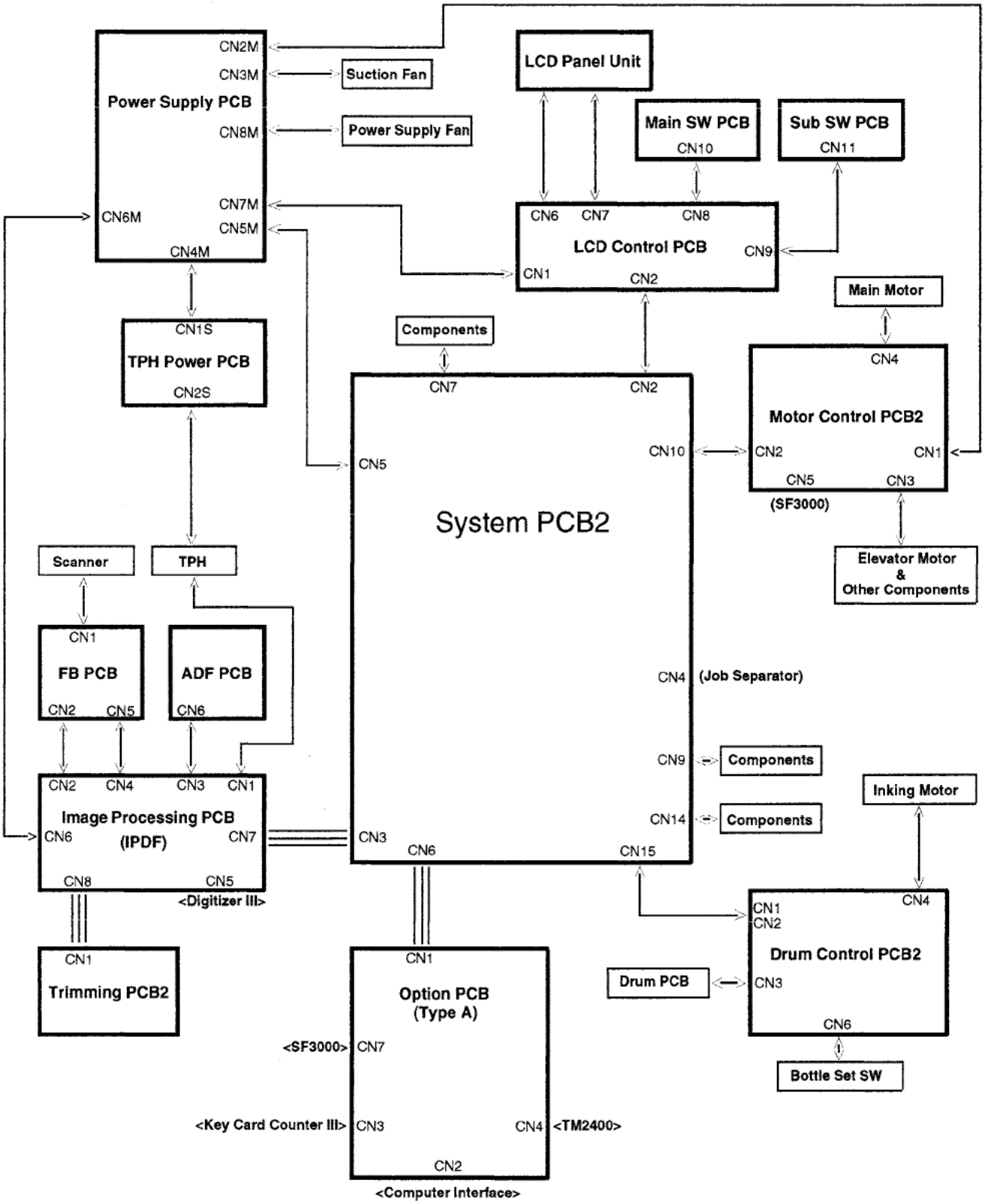
E 78

- Machine Model Selection Error -

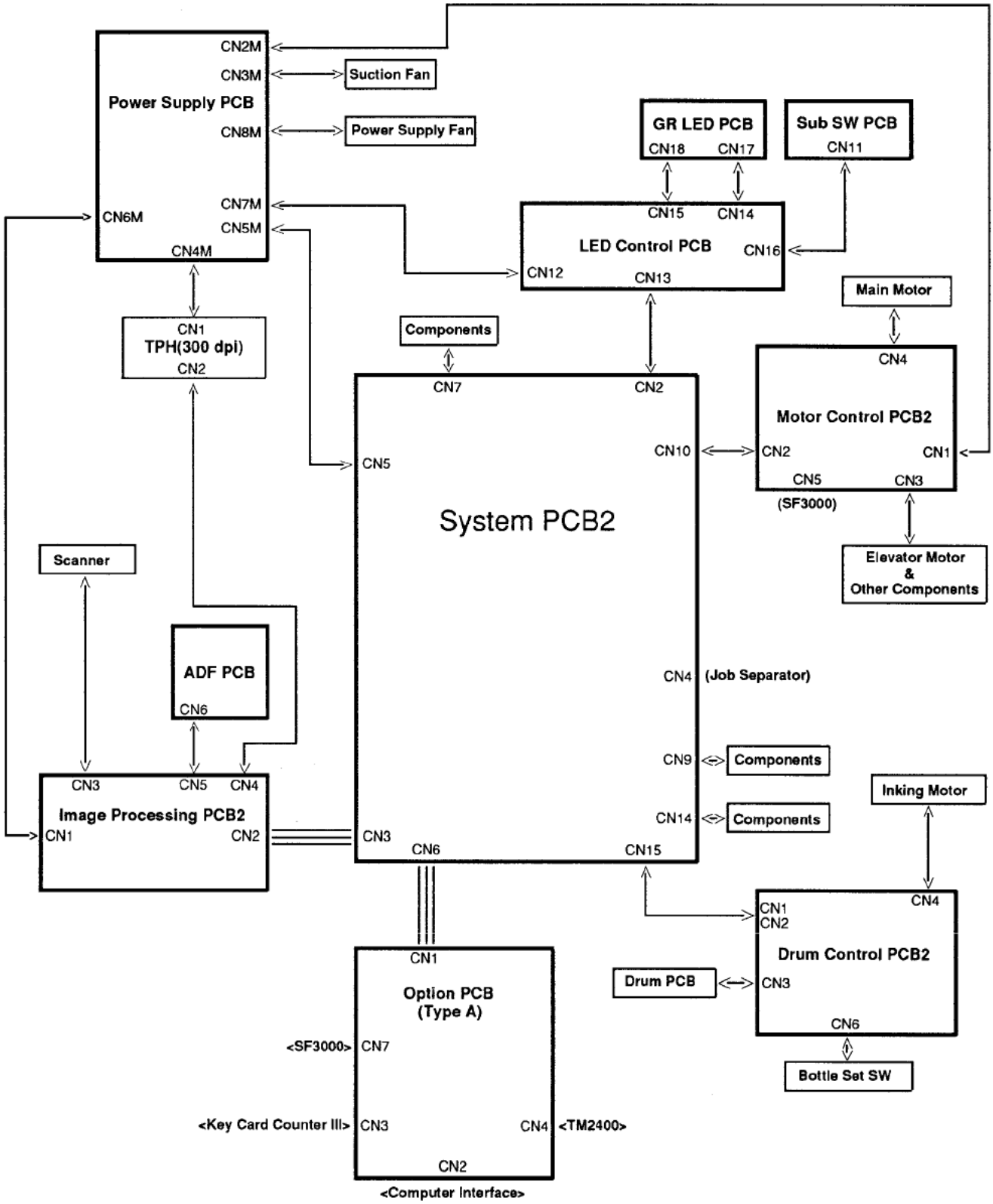
Displayed to interrupt the machine operation:
The SW2 (HEX SW) selection on the System PCB is set to "Not Used" position.

1.Block Chart

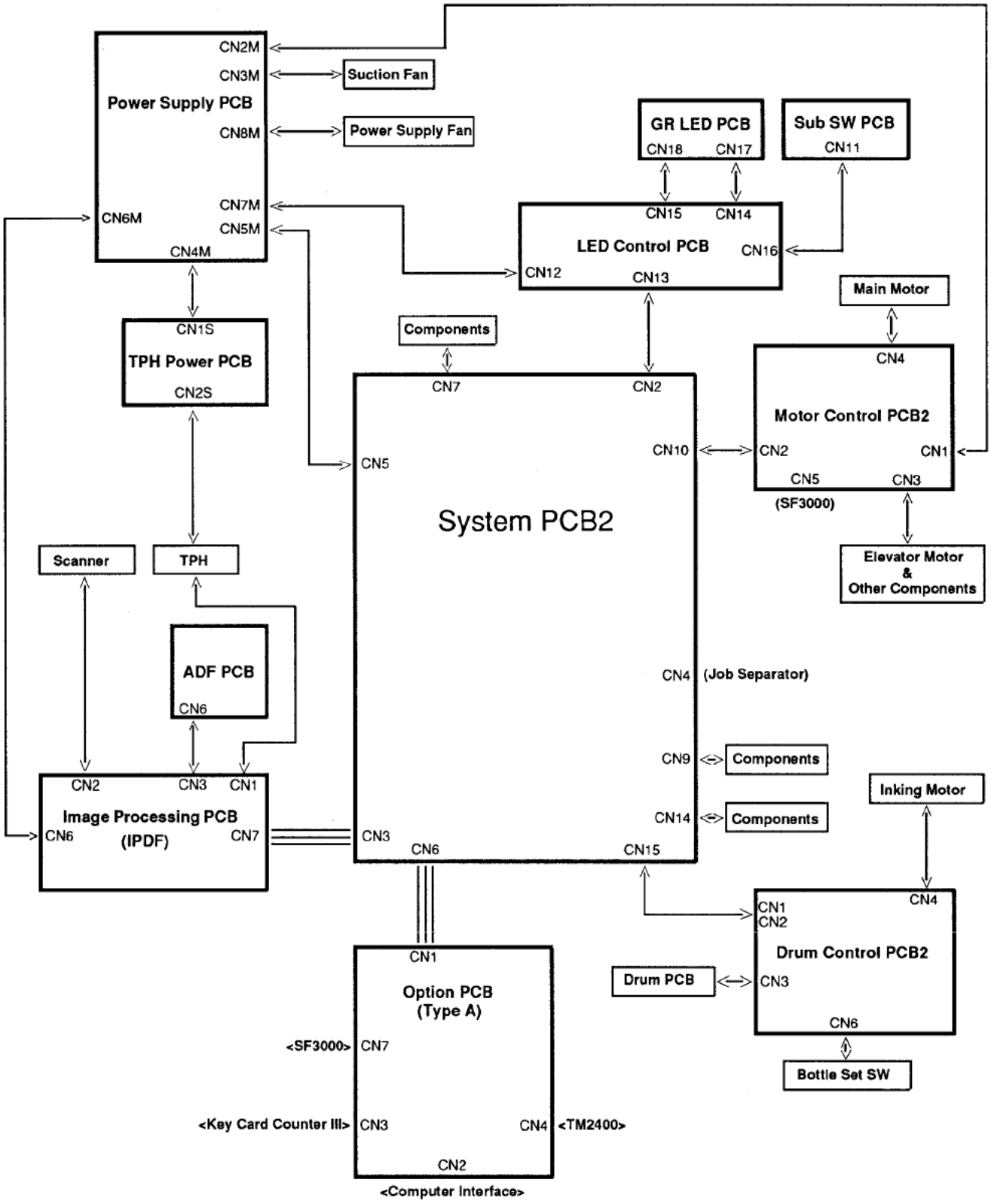
1-1. (GR2750 & 3750)



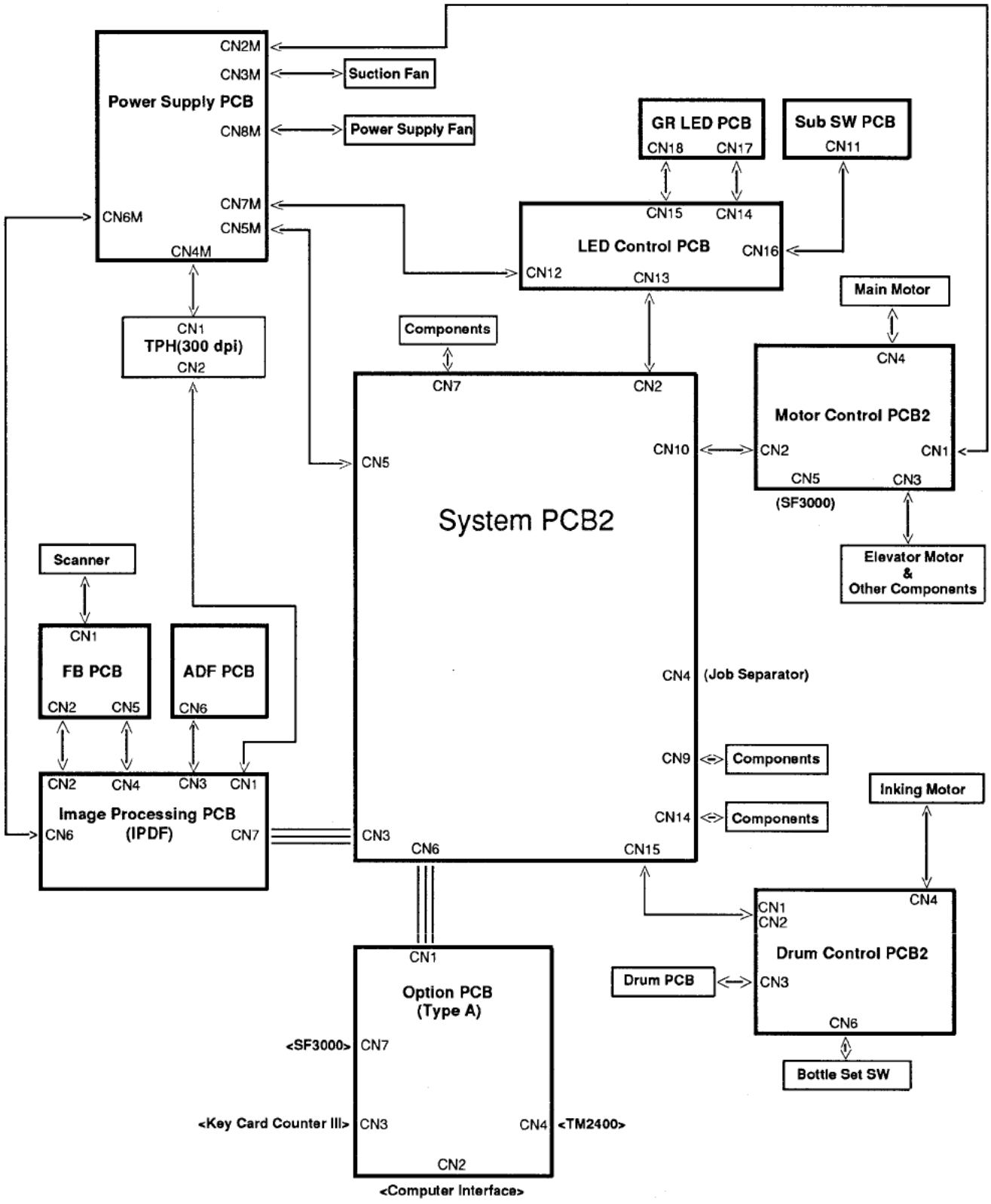
1-2. (GR1700)


CN2M
CN3M
Suction Fan
Power Supply PCB
CN8M
Power Supply Fan
CN7M
CN6M
CN5M
CN4M
GR LED PCB
CN18
CN17
Sub SW PCB
CN11
CN15
CN14
LED Control PCB
CN16
CN12
CN13
Main Motor
CN1
TPH(300 dpi)
CN2
Components
CN7
CN2
CN4
Motor Control PCB2
CN10
CN2
CN1
CN5
CN5
CN3
(SF3000)
System PCB2
Scanner
Elevator Motor
&
Other Components
ADF PCB
CN6
CN4
(Job Separator)
CN9
Components
CN3
CN5
CN4
Image Processing PCB2
CN1
CN2
CN14
Components
Inking Motor
CN3
CN6
CN15
CN4
CN1
CN2
Drum Control PCB2
CN1
Option PCB
(Type A)
Drum PCB
CN3
CN6
<SF3000>
CN7
Bottle Set SW
<Key Card Counter III>
CN3
CN4
<TM2400>
CN2
<Computer Interface>

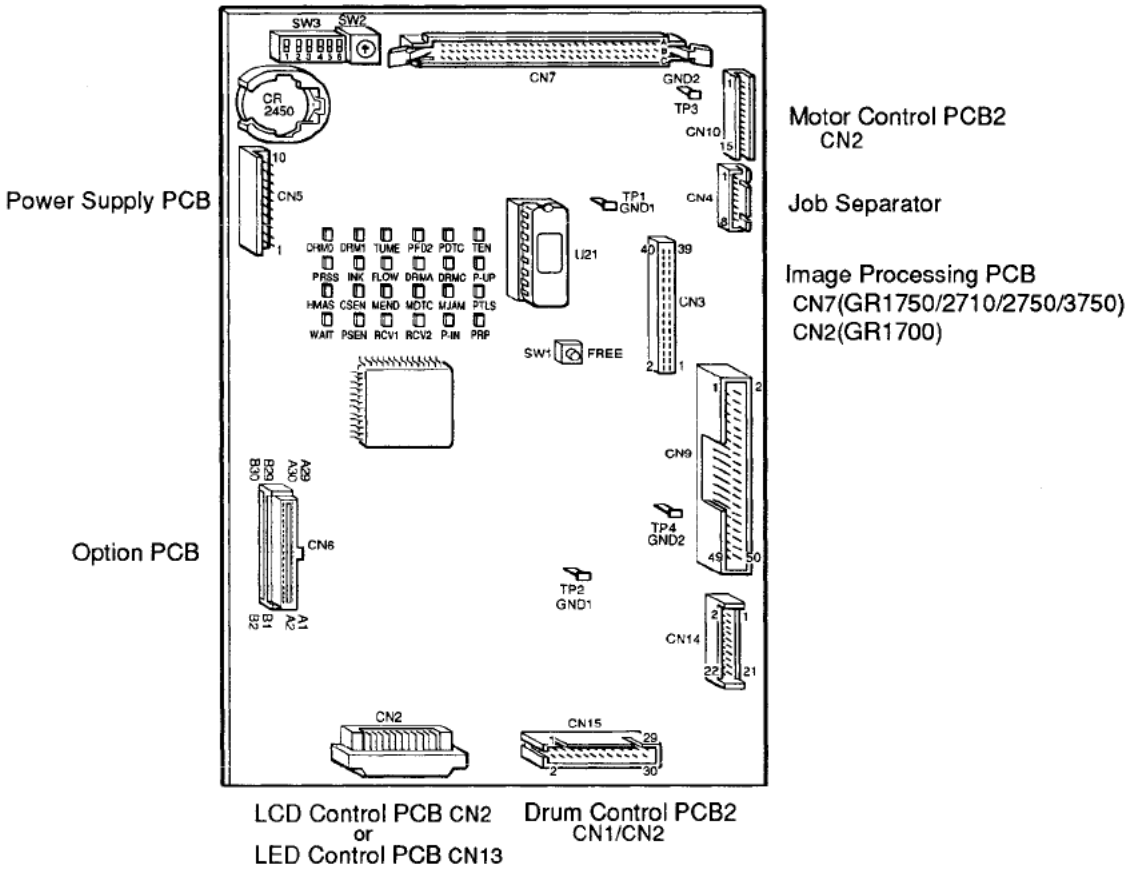
1-3. (GR1750)


CN2M
CN3M
Suction Fan
Power Supply PCB
CN8M
Power Supply Fan
GR LED PCB
CN18
CN17
Sub SW PCB
CN11
CN15
CN14
CN7M
CN6M
CN5M
CN4M
LED Control PCB
CN16
CN12
CN13
Main Motor
CN1S
TPH Power PCB
CN2S
Components
CN7
CN2
CN4
Motor Control PCB2
CN10
CN2
CN1
CN5
CN5
CN3
(SF3000)
System PCB2
Scanner
TPH
Elevator Motor
&
Other Components
ADF PCB
CN6
CN4
(Job Separator)
CN9
Components
CN2
CN3
CN1
Image Processing PCB
CN6
(IPDF)
CN7
CN14
Components
Inking Motor
CN3
CN6
CN15
CN1
CN2
CN4
Drum Control PCB2
CN1
Option PCB
(Type A)
Drum PCB
CN3
CN6
<SF3000>
CN7
Bottle Set SW
<Key Card Counter III>
CN3
CN4
<TM2400>
CN2
<Computer Interface>

1-4. (GR2710)


CN2M
CN3M
Suction Fan
Power Supply PCB
CN8M
Power Supply Fan
GR LED PCB
CN18
CN17
Sub SW PCB
CN11
CN15
CN14
CN7M
CN6M
CN5M
CN4M
LED Control PCB
CN16
CN12
CN13
Main Motor
CN1
TPH(300 dpi)
CN2
Components
CN7
CN2
CN4
Motor Control PCB2
CN10
CN2
CN1
CN5
CN5
CN3
(SF3000)
System PCB2
Scanner
Elevator Motor
&
Other Components
CN1
FB PCB
CN2
CN5
ADF PCB
CN6
CN4
(Job Separator)
CN9
Components
CN14
Components
Inking Motor
CN2
CN4
CN3
CN1
Image Processing PCB
CN6
(IPDF)
CN7
CN3
CN6
CN15
CN4
CN1
CN2
Drum Control PCB2
CN1
Option PCB
(Type A)
Drum PCB
CN3
CN6
<SF3000>
CN7
Bottle Set SW
<Key Card Counter III>
CN3
CN4
<TM2400>
CN2
<Computer Interface>

3. System PCB 2



SW

SW1 : Drum (Main motor) 30 rpm

SW2 : Machine Selection HEX SW

SW	LCD Type	LED Type
0	Not Used	Not Used
1	Not Used	Not Used
2	Not Used	Not Used
3	Not Used	Not Used
4	Not Used	**GR1700(B4)**
5	Not Used	**GR1700(A4)**
6	Not Used	**GR1700(Legal)**
7	Not Used	Not Used
8	**GR2750(B4)**	**GR2710(B4)**
9	**GR2750(A4)**	**GR2710(A4)**
A	**GR2750(Legal)**	**GR2710(Legal)**
B	Not Used	Not Used
C	**GR3750(A3)**	**GR1750(B4)**
D	**GR3750(Ledger)**	**GR1750(A4)**
E	Not Used	**GR1750(Legal)**
F	Not Used	Not Used

SW3 : Machine Selection DIP SW

LCD Type: (GR2750 & 3750)

SW	OFF	ON
1	●	
2	●	
3	●	
4	●	
5	●	
6	●	

LED Type: (GR1700,1750 & 2710)

SW	OFF	ON
1		●
2	●	
3	●	
4	●	
5	●	
6	●	

LED

LED	Sensor Name	When LED is ON
DRM0	0° Angular Sensor	Magnetism is detected
DRM1	180° Angular Sensor	Magnetism is detected
PFD2	Paper Feed Clutch Sensor	Light path is blocked
PDTC	Paper Detection Sensor	Reflected light detected
TEN	Vertical Centering Sensor	Light path is blocked
PRSS	Pressure Detection Sensor	Light path is blocked
INK	Ink Sensor	Ink is not detected
FLOW	Overflow Sensor	Ink is not detected
DRMA	Position A Sensor	Light path is blocked
DRMC	Position C Sensor	Light path is blocked
P-UP	Elevator Upper Limit Sensor	Light path is opened(actuator pressed)
HMAS	Disposal Box Master Sensor	Light path is opened(Master not detected)
CSEN	Master Loading Sensor	Reflected light(Master)detected
MEND	Master END Sensor	Reflected light(Master)detected
MDTC	Master Detection Sensor	Reflected light(Master) not detected
MJAM	Master Removal Sensor	Light path is blocked(Master detected)
PTLS	Paper Size Detection Sensor	Reflected light detected(Paper detected)
WAIT	Master Positioning Sensor	Reflected light(Master) not detected
PSEN	Paper Sensor	Light path is blocked(Paper detected)
RCV1	Paper Receiving Sensor 1	Light path is blocked(Paper detected)
RCV2	Paper Receiving Sensor 2	Light path is blocked(Paper detected)
P-IN	Paper Feed Detection Sensor	Light path is blocked(Paper detected)
PRP	Pressure Control Sensor	Light path is opened
TUME	Master Removal Hook Sensor	Light path is opened

TP

TP1 (GND1)	Ground for 5V lines.
TP2 (GND1)	Ground for 12V lines.
TP3 (GND2)	Ground for 24VA lines.
TP4 (GND2)	Ground for 24VC lines.

BATTERY

CR2450	1 piece

System PCB2

CN2 40PINS

D00	A20	Rd	A1
GND1	A19	Gy	A2
D01	A18	Gy	A3
GND1	A17	Gy	A4
D02	A16	Bl	A5
GND1	A15	Gy	A6
D03	A14	Gy	A7
GND1	A13	Gy	A8
D04	A12	Gy	A9
GND1	A11	Bl	A10
D05	A10	Gy	A11
GND1	A9	Gy	A12
D06	A8	Gy	A13
GND1	A7	Gy	A14
D07	A6	Bl	A15
GND1	A5	Gy	A16
A00	A4	Gy	A17
GND1	A3	Gy	A18
A01	A2	Gy	A19
GND1	A1	Bl	A20
A02	B20	Rd	B1
GND1	B19	Gy	B2
PNL-CS/	B18	Gy	B3
GND1	B17	Gy	B4
IORD/	B16	Bl	B5
GND1	B15	Gy	B6
IOWR/	B14	Gy	B7
GND1	B13	Gy	B8
RESET/	B12	Gy	B9
GND1	B11	Bl	B10
IREQ/	B10	Gy	B11
GND1	B9	Gy	B12
PNL-EN/	B8	Gy	B13
GND1	B7	Gy	B14
WAIT	B6	Bl	B15
GND1	B5	Gy	B16
BUSY	B4	Gy	B17
GND1	B3	Gy	B18
N.C	B2	Gy	B19
N.C	B1	Bl	B20

LCD Control PCB
CN2(GR2750/3750)

LED Control PCB
CN13
(GR1700/1750/2710)

CN3 40PINS

ADGND	1	
ADVCC	2	
	3	
Paper size sensor	4	
Temp.det.sensor	5	
	6	
GND1	7	
GND1	8	
GND1	9	
GND1	10	
D00	11	
D01	12	
D02	13	
D03	14	
D04	15	
D05	16	
D06	17	
D07	18	
GAZO-CS1/	19	
GAZO-CS2/	20	Image Processing PCB
IOWR/	21	
IORD/	22	CN7(GR1750/2710 /2750/3750)
A00	23	CN2(GR1700)
A01	24	
A02	25	
A03	26	
A04	27	
A05	28	
CK/	29	
LST/	30	
YUKOU/	31	
KUKAN	32	
	33	
I/F-RDDATA	34	
I/F-WRDATA	35	
GND1	36	
GND1	37	
GND1	38	
GND1	39	
RESET/	40	

CN6 60PINS

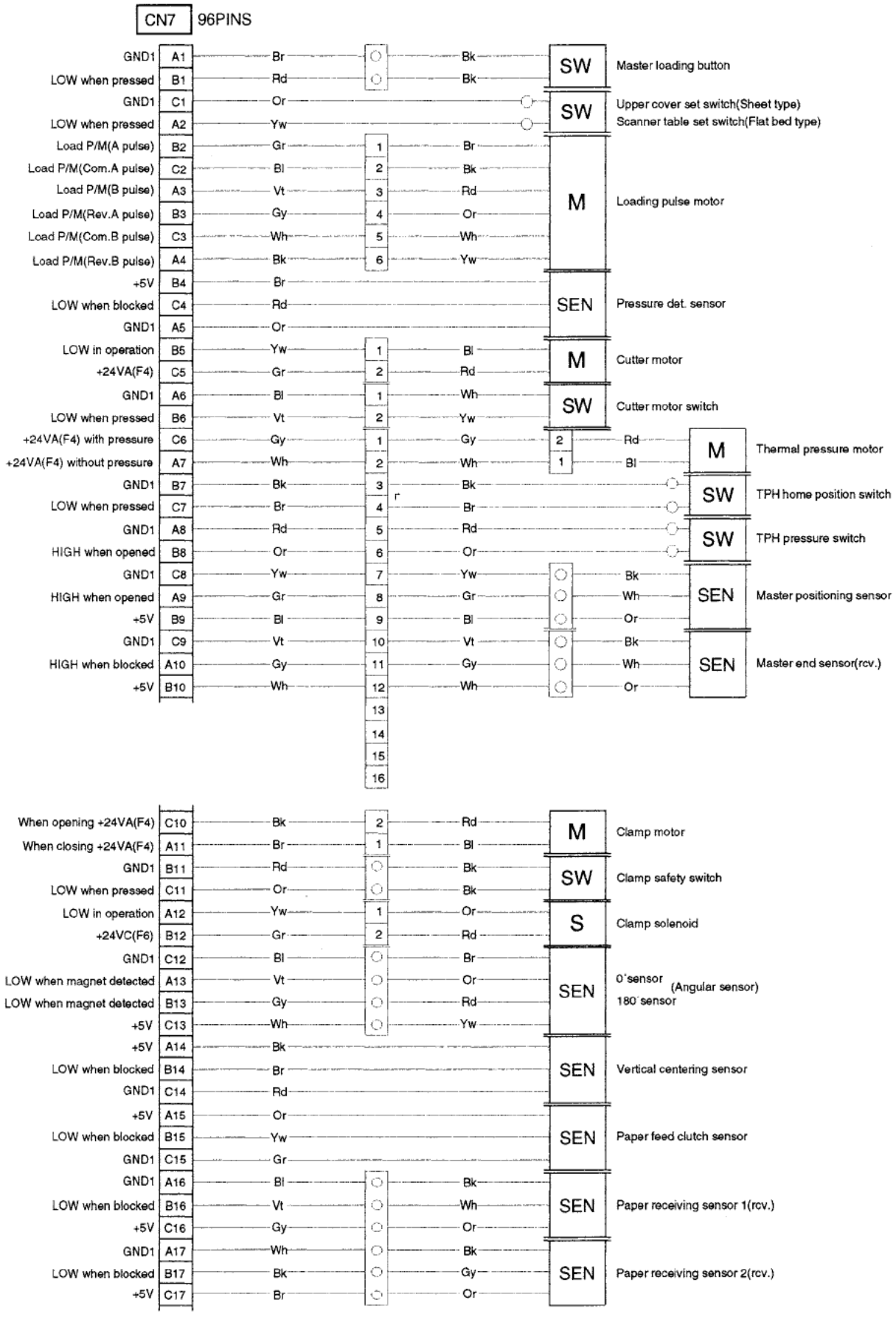
GND1	A1	
GND1	B1	
GND1	A2	
GND1	B2	
GND1	A3	
GND1	B3	
+5V	A4	
+5V	B4	
+5V	A5	
+5V	B5	
GND2	A6	
GND2	B6	
GND2	A7	
+24VB(F5)	B7	
+24VB(F5)	A8	
+24VB(F5)	B8	
TXD1	A9	
RXD1	B9	
RTS1/	A10	
CTS1/	B10	
TXD2	A11	
RXD2	B11	
RTS2/	A12	
CTS2/	B12	
TXD3	A13	
RXD3	B13	
RTS3/	A14	
CTS3/	B14	
I/F PCB set sig.	A15	
Paper sensor sig.	B15	Option PCB(I/F)
Paper rcv.sen.2 sig.	A16	CN1
Master count sig.	B16	
Copy count sig.	A17	
CK/	B17	
LST/	A18	
YUKOU/	B18	
N.C	A19	
I/F- RDDATE	B19	
I/F-WRDATE	A20	
N.C	B20	
D00	A21	
D01	B21	
D02	A22	
D03	B22	
D04	A23	
D05	B23	
D06	A24	
D07	B24	
A00	A25	
A01	B25	
A02	A26	
A03	B26	
N.C	A27	
Paper feed det.sen. sig.	B27	
N.C	A28	
N.C	B28	
CS/	A29	
RD/	B29	
WR/	A30	
RESET	B30	

CN4 8PINS

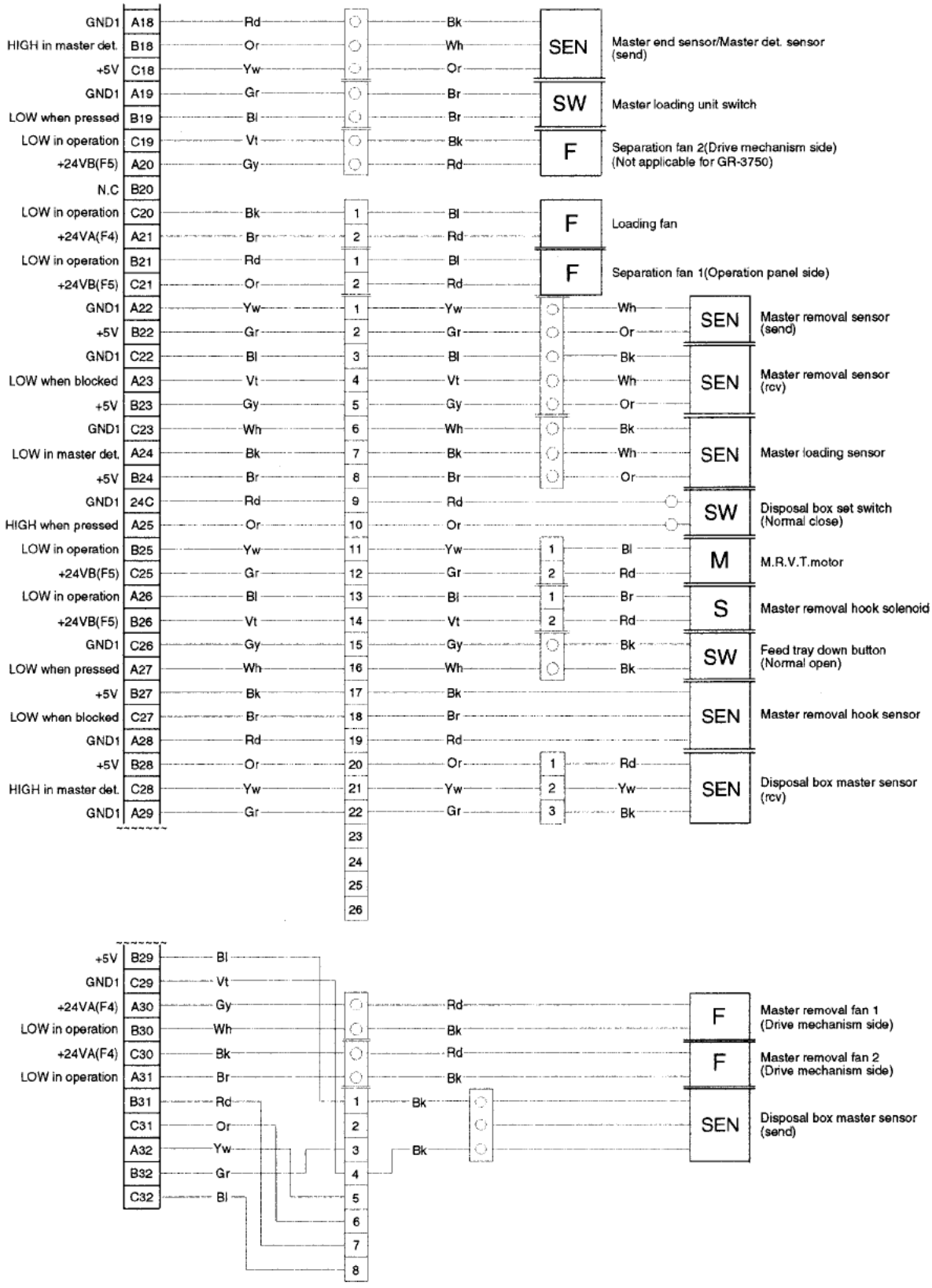
GND1	1	Br	1	
	2			
Signal A	3	Or	2	
Signal B	4	Rd	3	Job Separator
GND1	5		4	
+5V	6	Yw	5	
GND2	7	Gr	6	
+24V(F5)	8	Bl		

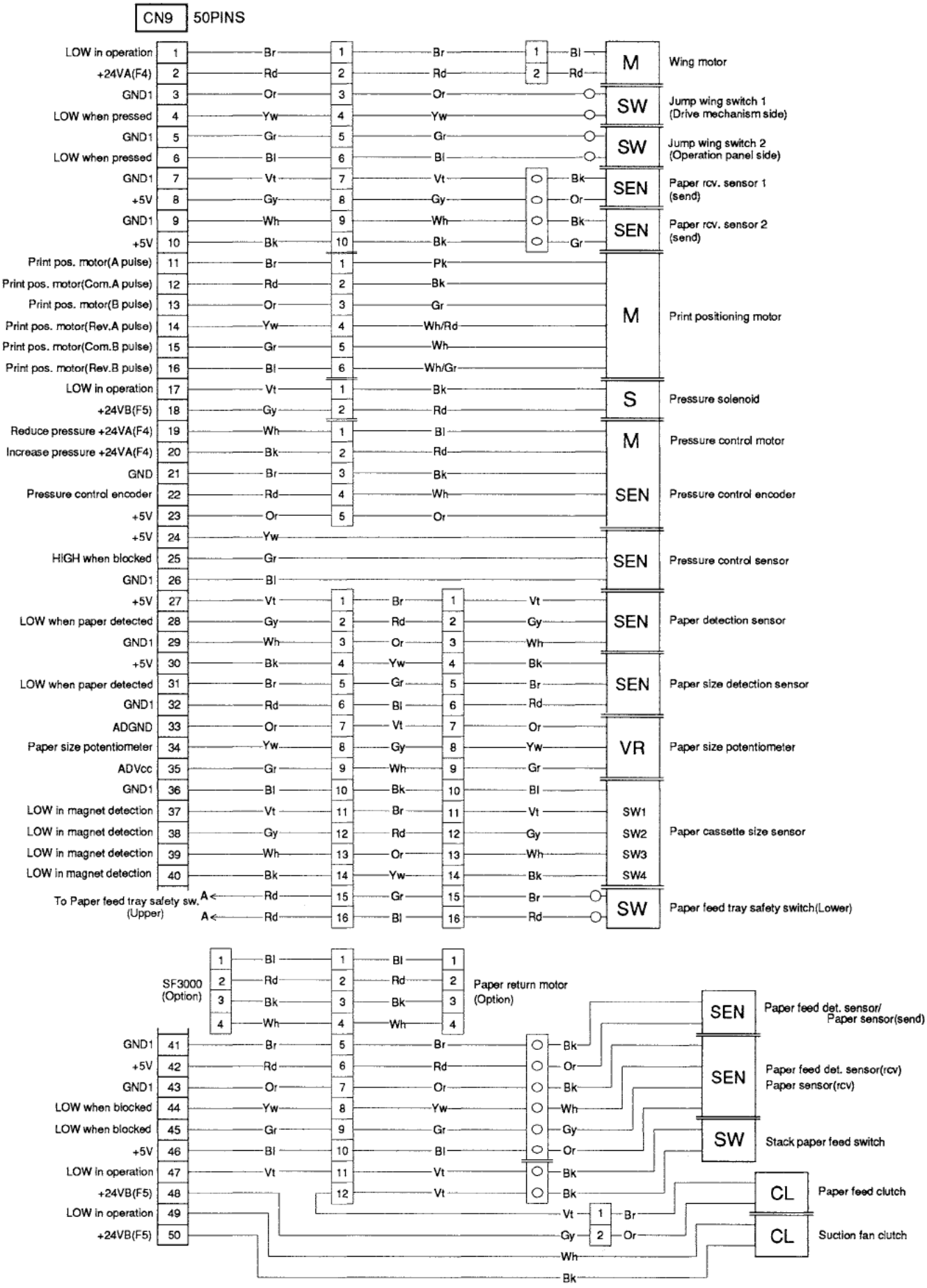
CN5 10PINS

+5V	1	Br	1	
GND1	2	Rd	2	
+12V	3	Or	3	
TPH CTL sig.	4	Yw	4	
Suction Fan sig.	5	Gr	5	Power Supply PCB
Power fail sig.	6	Bl	6	CN5M
+24VA(F4)	7	Vt	7	
+24VB(F5)	8	Gy	8	
+24VC(F6)	9	Wh	9	
GND2	10	Bk	10	

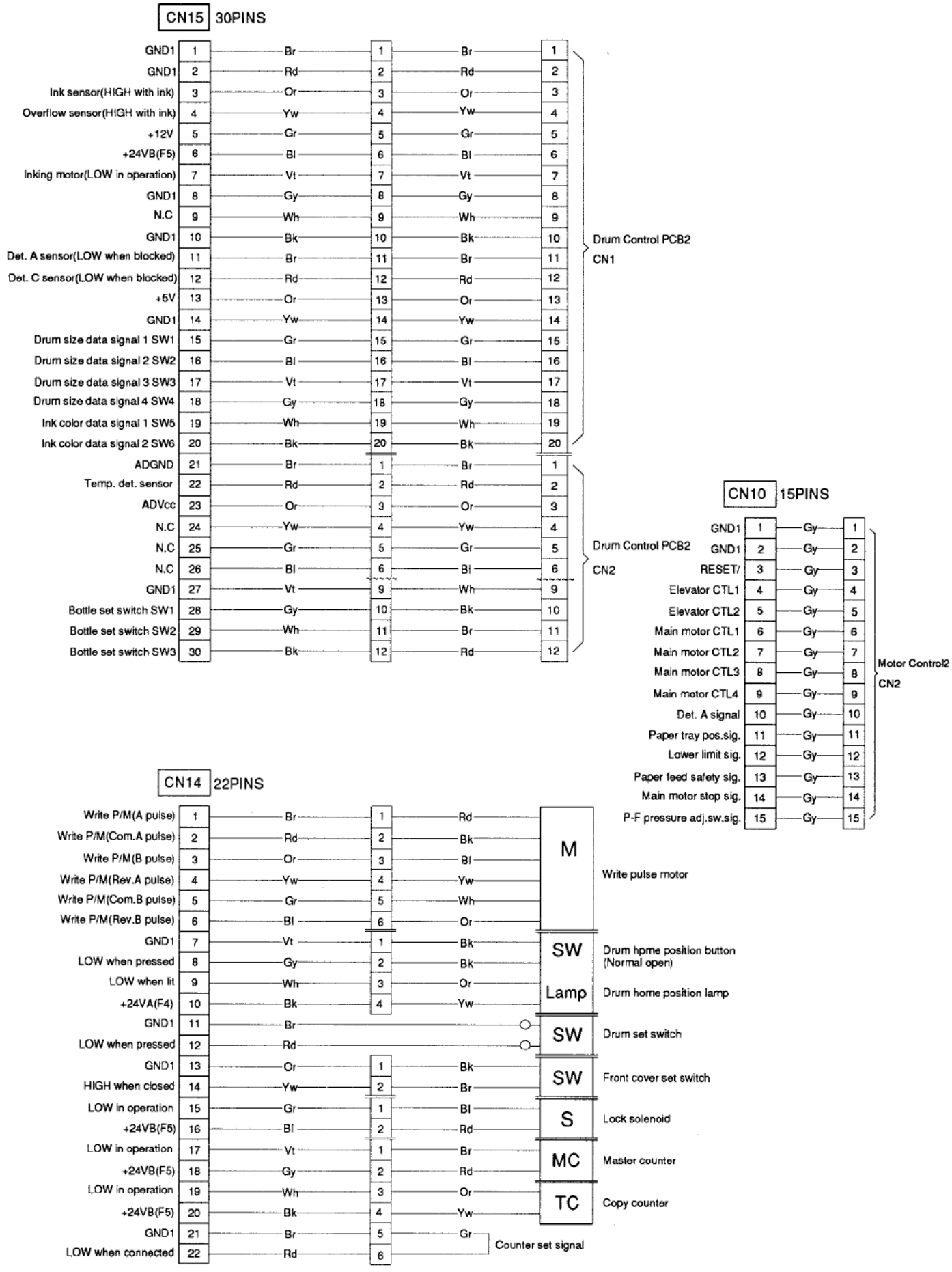

CN7
96PINS
GND1 A1 Br Bk SW Master loading button
LOW when pressed B1 Rd Bk
GND1 C1 Or SW Upper cover set switch(Sheet type)
LOW when pressed A2 Yw Scanner table set switch(Flat bed type)
Load P/M(A pulse) B2 Gr 1 Br M Loading pulse motor
Load P/M(Com.A pulse) C2 Bl 2 Bk
Load P/M(B pulse) A3 Vt 3 Rd
Load P/M(Rev.A pulse) B3 Gy 4 Or
Load P/M(Com.B pulse) C3 Wh 5 Wh
Load P/M(Rev.B pulse) A4 Bk 6 Yw
+5V B4 Br SEN Pressure det. sensor
LOW when blocked C4 Rd
GND1 A5 Or
LOW in operation B5 Yw 1 Bl M Cutter motor
+24VA(F4) C5 Gr 2 Rd
GND1 A6 Bl 1 Wh SW Cutter motor switch
LOW when pressed B6 Vt 2 Yw
+24VA(F4) with pressure C6 Gy 1 Gy 2 Rd M Thermal pressure motor
+24VA(F4) without pressure A7 Wh 2 Wh 1 Bl
GND1 B7 Bk 3 Bk SW TPH home position switch
LOW when pressed C7 Br 4 Br
GND1 A8 Rd 5 Rd SW TPH pressure switch
HIGH when opened B8 Or 6 Or
GND1 C8 Yw 7 Yw Bk SEN Master positioning sensor
HIGH when opened A9 Gr 8 Gr Wh
+5V B9 Bl 9 Bl Or
GND1 C9 Vt 10 Vt Bk SEN Master end sensor(rcv.)
HIGH when blocked A10 Gy 11 Gy Wh
+5V B10 Wh 12 Wh Or
13
14
15
16
When opening +24VA(F4) C10 Bk 2 Rd M Clamp motor
When closing +24VA(F4) A11 Br 1 Bl
GND1 B11 Rd Bk SW Clamp safety switch
LOW when pressed C11 Or Bk
LOW in operation A12 Yw 1 Or S Clamp solenoid
+24VC(F6) B12 Gr 2 Rd
GND1 C12 Bl Br SEN 0°sensor (Angular sensor)
LOW when magnet detected A13 Vt Or
LOW when magnet detected B13 Gy Rd 180°sensor
+5V C13 Wh Yw
+5V A14 Bk SEN Vertical centering sensor
LOW when blocked B14 Br
GND1 C14 Rd
+5V A15 Or SEN Paper feed clutch sensor
LOW when blocked B15 Yw
GND1 C15 Gr
GND1 A16 Bl Bk SEN Paper receiving sensor 1(rcv.)
LOW when blocked B16 Vt Wh
+5V C16 Gy Or
GND1 A17 Wh Bk SEN Paper receiving sensor 2(rcv.)
LOW when blocked B17 Bk Gy
+5V C17 Br Or

System PCB2

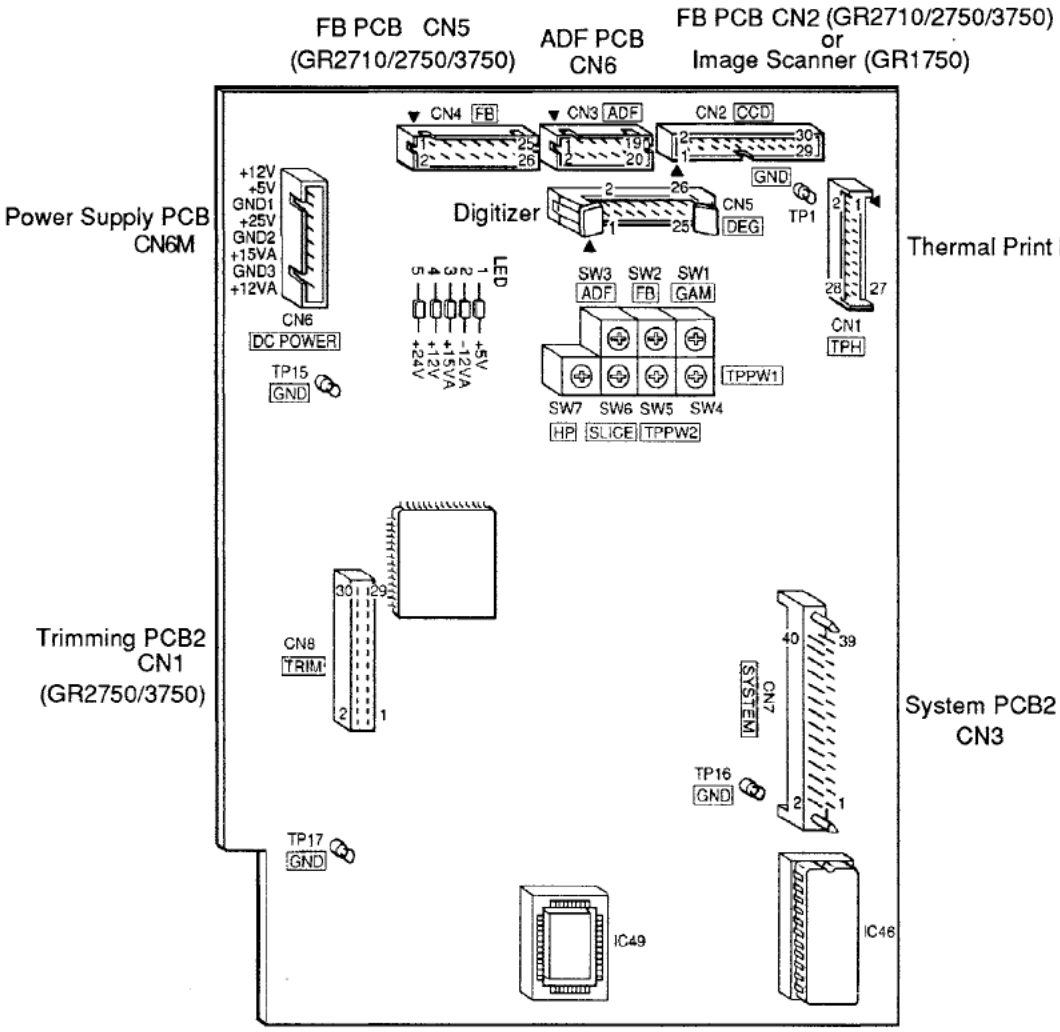

GND1 A18 Rd Bk SEN Master end sensor/Master det. sensor (send)
HIGH in master det. B18 Or Wh
+5V C18 Yw Or
GND1 A19 Gr Br SW Master loading unit switch
LOW when pressed B19 Bl Br
LOW in operation C19 Vt Bk F Separation fan 2(Drive mechanism side) (Not applicable for GR-3750)
+24VB(F5) A20 Gy Rd
N.C B20
LOW in operation C20 Bk 1 Bl F Loading fan
+24VA(F4) A21 Br 2 Rd
LOW in operation B21 Rd 1 Bl F Separation fan 1(Operation panel side)
+24VB(F5) C21 Or 2 Rd
GND1 A22 Yw 1 Yw Wh SEN Master removal sensor (send)
+5V B22 Gr 2 Gr Or
GND1 C22 Bl 3 Bl Bk SEN Master removal sensor (rcv)
LOW when blocked A23 Vt 4 Vt Wh
+5V B23 Gy 5 Gy Or
GND1 C23 Wh 6 Wh Bk SEN Master loading sensor
LOW in master det. A24 Bk 7 Bk Wh
+5V B24 Br 8 Br Or
GND1 24C Rd 9 Rd SW Disposal box set switch (Normal close)
HIGH when pressed A25 Or 10 Or
LOW in operation B25 Yw 11 Yw 1 Bl M M.R.V.T.motor
+24VB(F5) C25 Gr 12 Gr 2 Rd
LOW in operation A26 Bl 13 Bl 1 Br S Master removal hook solenoid
+24VB(F5) B26 Vt 14 Vt 2 Rd
GND1 C26 Gy 15 Gy Bk SW Feed tray down button (Normal open)
LOW when pressed A27 Wh 16 Wh Bk
+5V B27 Bk 17 Bk SEN Master removal hook sensor
LOW when blocked C27 Br 18 Br
GND1 A28 Rd 19 Rd
+5V B28 Or 20 Or 1 Rd SEN Disposal box master sensor (rcv)
HIGH in master det. C28 Yw 21 Yw 2 Yw
GND1 A29 Gr 22 Gr 3 Bk
23
24
25
26
+5V B29 Bl F Master removal fan 1 (Drive mechanism side)
GND1 C29 Vt
+24VA(F4) A30 Gy Rd F Master removal fan 2 (Drive mechanism side)
LOW in operation B30 Wh Bk
+24VA(F4) C30 Bk Rd
LOW in operation A31 Br Bk
B31 Rd 1 Bk SEN Disposal box master sensor (send)
C31 Or 2
A32 Yw 3 Bk
B32 Gr 4
C32 Bl 5
6
7
8


CN9
50PINS
LOW in operation
+24VA(F4)
GND1
LOW when pressed
GND1
LOW when pressed
GND1
+5V
GND1
+5V
Print pos. motor(A pulse)
Print pos. motor(Com.A pulse)
Print pos. motor(B pulse)
Print pos. motor(Rev.A pulse)
Print pos. motor(Com.B pulse)
Print pos. motor(Rev.B pulse)
LOW in operation
+24VB(F5)
Reduce pressure +24VA(F4)
Increase pressure +24VA(F4)
GND
Pressure control encoder
+5V
+5V
HIGH when blocked
GND1
+5V
LOW when paper detected
GND1
+5V
LOW when paper detected
GND1
ADGND
Paper size potentiometer
ADVcc
GND1
LOW in magnet detection
LOW in magnet detection
LOW in magnet detection
LOW in magnet detection
To Paper feed tray safety sw. (Upper)
M
Wing motor
SW
Jump wing switch 1 (Drive mechanism side)
SW
Jump wing switch 2 (Operation panel side)
SEN
Paper rcv. sensor 1 (send)
SEN
Paper rcv. sensor 2 (send)
M
Print positioning motor
S
Pressure solenoid
M
Pressure control motor
SEN
Pressure control encoder
SEN
Pressure control sensor
SEN
Paper detection sensor
SEN
Paper size detection sensor
VR
Paper size potentiometer
SW1
SW2
SW3
SW4
Paper cassette size sensor
SW
Paper feed tray safety switch(Lower)
SF3000 (Option)
Paper return motor (Option)
GND1
+5V
GND1
LOW when blocked
LOW when blocked
+5V
LOW in operation
+24VB(F5)
LOW in operation
+24VB(F5)
SEN
Paper feed det. sensor/ Paper sensor(send)
SEN
Paper feed det. sensor(rcv) Paper sensor(rcv)
SW
Stack paper feed switch
CL
Paper feed clutch
CL
Suction fan clutch

System PCB2


CN15 30PINS
GND1 1 Br 1 Br 1
GND1 2 Rd 2 Rd 2
Ink sensor(HIGH with ink) 3 Or 3 Or 3
Overflow sensor(HIGH with ink) 4 Yw 4 Yw 4
+12V 5 Gr 5 Gr 5
+24VB(F5) 6 Bl 6 Bl 6
Inking motor(LOW in operation) 7 Vt 7 Vt 7
GND1 8 Gy 8 Gy 8
N.C 9 Wh 9 Wh 9
GND1 10 Bk 10 Bk 10
Det. A sensor(LOW when blocked) 11 Br 11 Br 11
Det. C sensor(LOW when blocked) 12 Rd 12 Rd 12
+5V 13 Or 13 Or 13
GND1 14 Yw 14 Yw 14
Drum size data signal 1 SW1 15 Gr 15 Gr 15
Drum size data signal 2 SW2 16 Bl 16 Bl 16
Drum size data signal 3 SW3 17 Vt 17 Vt 17
Drum size data signal 4 SW4 18 Gy 18 Gy 18
Ink color data signal 1 SW5 19 Wh 19 Wh 19
Ink color data signal 2 SW6 20 Bk 20 Bk 20
Drum Control PCB2
CN1
ADGND 21 Br 1 Br 1
Temp. det. sensor 22 Rd 2 Rd 2
ADVcc 23 Or 3 Or 3
N.C 24 Yw 4 Yw 4
N.C 25 Gr 5 Gr 5
N.C 26 Bl 6 Bl 6
GND1 27 Vt 9 Wh 9
Bottle set switch SW1 28 Gy 10 Bk 10
Bottle set switch SW2 29 Wh 11 Br 11
Bottle set switch SW3 30 Bk 12 Rd 12
Drum Control PCB2
CN2
CN10 15PINS
GND1 1 Gy 1
GND1 2 Gy 2
RESET/ 3 Gy 3
Elevator CTL1 4 Gy 4
Elevator CTL2 5 Gy 5
Main motor CTL1 6 Gy 6
Main motor CTL2 7 Gy 7
Main motor CTL3 8 Gy 8
Main motor CTL4 9 Gy 9
Det. A signal 10 Gy 10
Paper tray pos.sig. 11 Gy 11
Lower limit sig. 12 Gy 12
Paper feed safety sig. 13 Gy 13
Main motor stop sig. 14 Gy 14
P-F pressure adj.sw.sig. 15 Gy 15
Motor Control2
CN2
CN14 22PINS
Write P/M(A pulse) 1 Br 1 Rd
Write P/M(Com.A pulse) 2 Rd 2 Bk
Write P/M(B pulse) 3 Or 3 Bl
Write P/M(Rev.A pulse) 4 Yw 4 Yw
Write P/M(Com.B pulse) 5 Gr 5 Wh
Write P/M(Rev.B pulse) 6 Bl 6 Or
M
Write pulse motor
GND1 7 Vt 1 Bk
LOW when pressed 8 Gy 2 Bk
SW
Drum hpme position button (Normal open)
LOW when lit 9 Wh 3 Or
+24VA(F4) 10 Bk 4 Yw
Lamp
Drum home position lamp
GND1 11 Br
LOW when pressed 12 Rd
SW
Drum set switch
GND1 13 Or 1 Bk
HIGH when closed 14 Yw 2 Br
SW
Front cover set switch
LOW in operation 15 Gr 1 Bl
+24VB(F5) 16 Bl 2 Rd
S
Lock solenoid
LOW in operation 17 Vt 1 Br
+24VB(F5) 18 Gy 2 Rd
MC
Master counter
LOW in operation 19 Wh 3 Or
+24VB(F5) 20 Bk 4 Yw
TC
Copy counter
GND1 21 Br 5 Gr
LOW when connected 22 Rd 6
Counter set signal

4. Image Processing PCB(IPDF) (GR1750,2710,2750 & 3750)



SW

SW1 (GAM)	:	Gamma (γ) compensation for contrast balance adjustment in image scanning
SW2 (FB)	:	For image elongation/shrinkage correction in image scanning(Flat Bed Type)
SW3 (ADF)	:	For image elongation/shrinkage correction in image scanning(Sheet Type)
SW4 (TPPW1)	:	For adjustment of heating power of Thermal print head
SW5 (TPPW2)	:	For adjustment of heating power of Thermal print head
SW6 (SLICE)	:	For adjustment of "Line-copy mode" slice level
SW7 (HP)	:	For fine adjustment of Paper size potentiometer

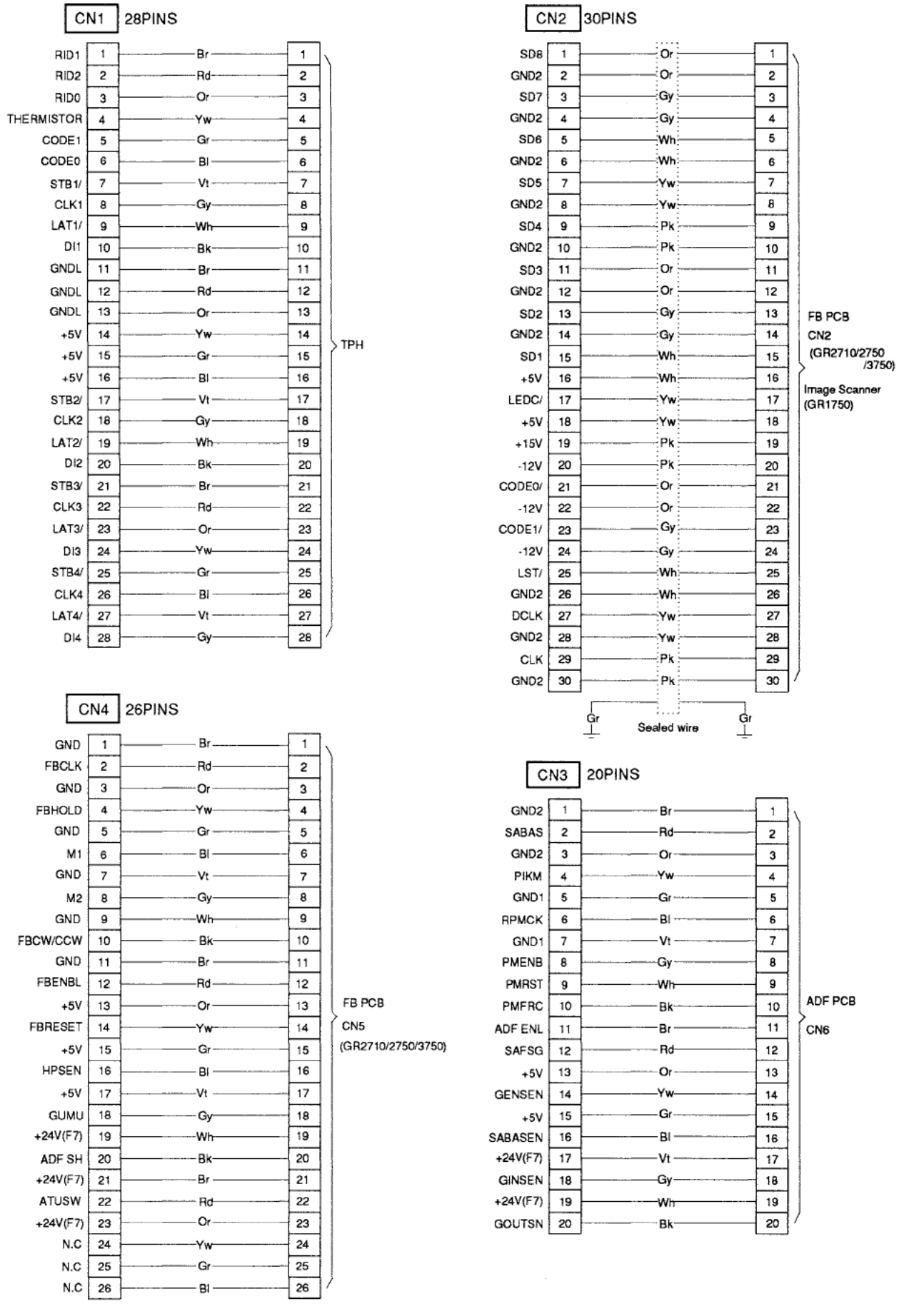
LED **- When LED is ON -**

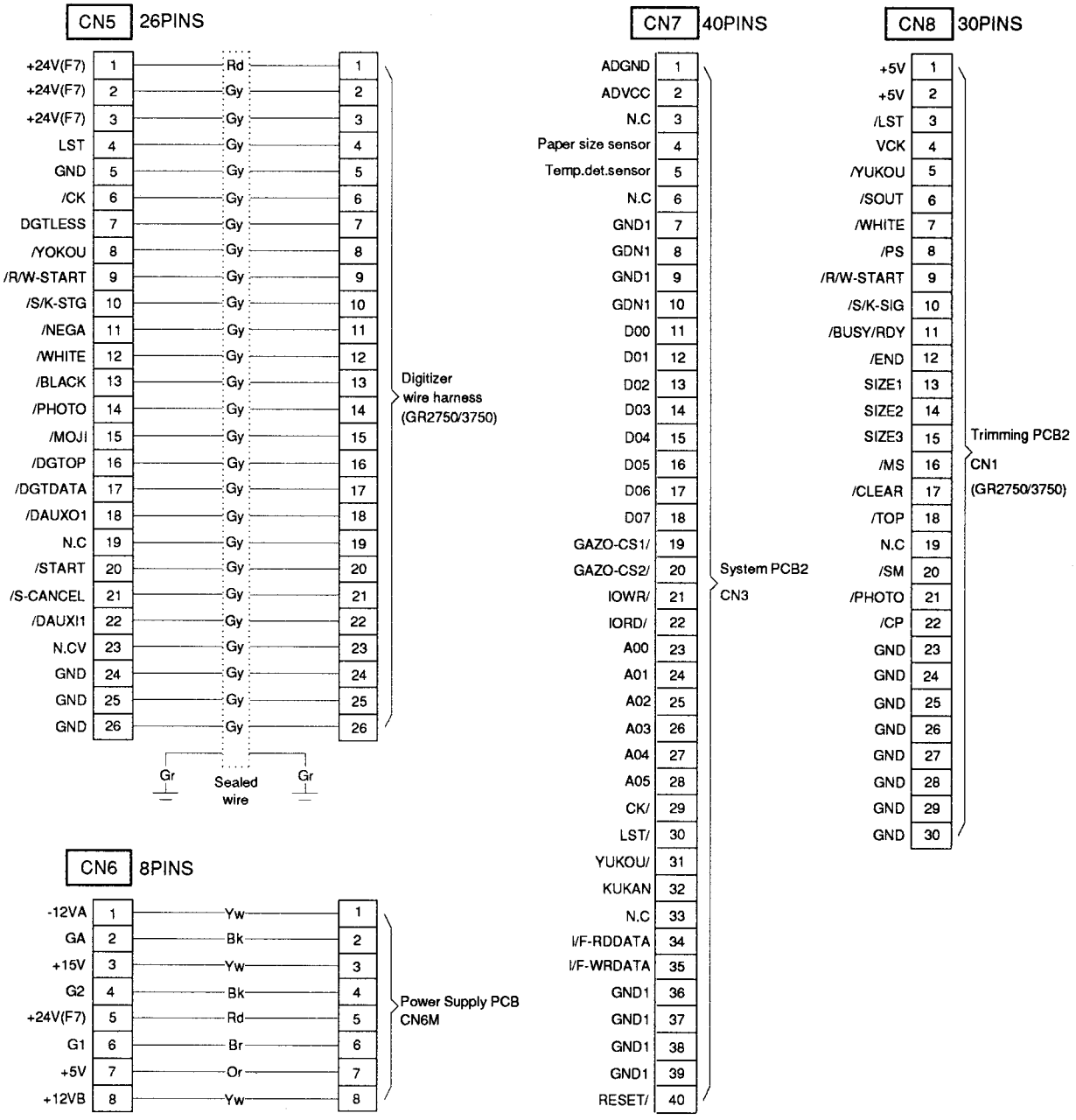
LED 1 (+ 5V)	:	+ 5V is supplied to PCB.
LED 2 (-12VA)	:	-12V is supplied to PCB.
LED 3 (+15VA)	:	+15V is supplied to PCB.
LED 4 (+12V)	:	+12V is supplied to PCB.
LED 5 (+24V)	:	+24V is supplied to PCB.

TP

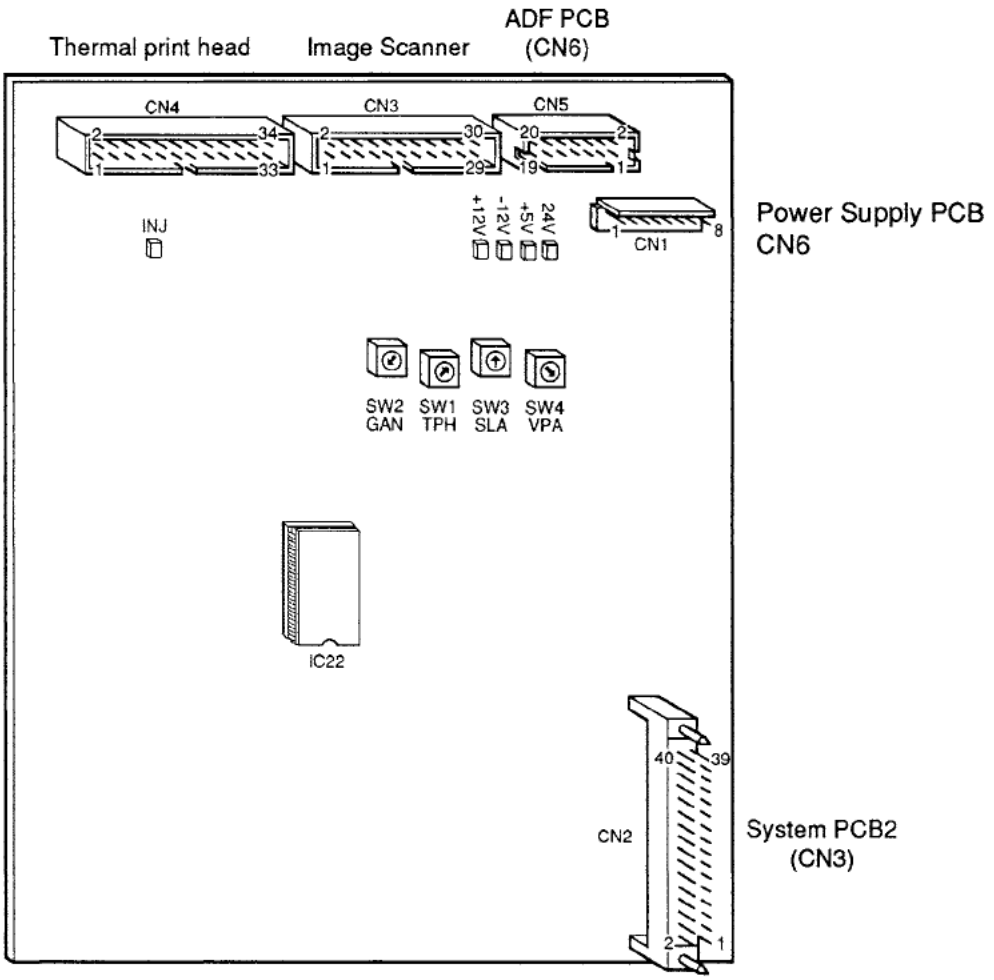
TP1 (GND)	:	GND
TP15 (GND)	:	GND
TP16 (GND)	:	GND
TP17 (GND)	:	GND

Image Processing PCB(IPDF)




CN5 26PINS
+24V(F7) 1 Rd 1
+24V(F7) 2 Gy 2
+24V(F7) 3 Gy 3
LST 4 Gy 4
GND 5 Gy 5
/CK 6 Gy 6
DGTLESS 7 Gy 7
/YOKOU 8 Gy 8
/R/W-START 9 Gy 9
/S/K-STG 10 Gy 10
/NEGA 11 Gy 11
/WHITE 12 Gy 12
/BLACK 13 Gy 13
/PHOTO 14 Gy 14
/MOJI 15 Gy 15
/DGTOP 16 Gy 16
/DGTDATA 17 Gy 17
/DAUXO1 18 Gy 18
N.C 19 Gy 19
/START 20 Gy 20
/S-CANCEL 21 Gy 21
/DAUXI1 22 Gy 22
N.CV 23 Gy 23
GND 24 Gy 24
GND 25 Gy 25
GND 26 Gy 26
Digitizer wire harness (GR2750/3750)
Gr
Sealed wire
Gr
CN6 8PINS
-12VA 1 Yw 1
GA 2 Bk 2
+15V 3 Yw 3
G2 4 Bk 4
+24V(F7) 5 Rd 5
G1 6 Br 6
+5V 7 Or 7
+12VB 8 Yw 8
Power Supply PCB CN6M
CN7 40PINS
ADGND 1
ADVCC 2
N.C 3
Paper size sensor 4
Temp.det.sensor 5
N.C 6
GND1 7
GDN1 8
GND1 9
GDN1 10
D00 11
D01 12
D02 13
D03 14
D04 15
D05 16
D06 17
D07 18
GAZO-CS1/ 19
GAZO-CS2/ 20
IOWR/ 21
IORD/ 22
A00 23
A01 24
A02 25
A03 26
A04 27
A05 28
CK/ 29
LST/ 30
YUKOU/ 31
KUKAN 32
N.C 33
I/F-RDDATA 34
I/F-WRDATA 35
GND1 36
GND1 37
GND1 38
GND1 39
RESET/ 40
System PCB2 CN3
CN8 30PINS
+5V 1
+5V 2
/LST 3
VCK 4
/YUKOU 5
/SOUT 6
/WHITE 7
/PS 8
/R/W-START 9
/S/K-SIG 10
/BUSY/RDY 11
/END 12
SIZE1 13
SIZE2 14
SIZE3 15
/MS 16
/CLEAR 17
/TOP 18
N.C 19
/SM 20
/PHOTO 21
/CP 22
GND 23
GND 24
GND 25
GND 26
GND 27
GND 28
GND 29
GND 30
Trimming PCB2 CN1 (GR2750/3750)

5. Image Processing PCB2 (GR1700)

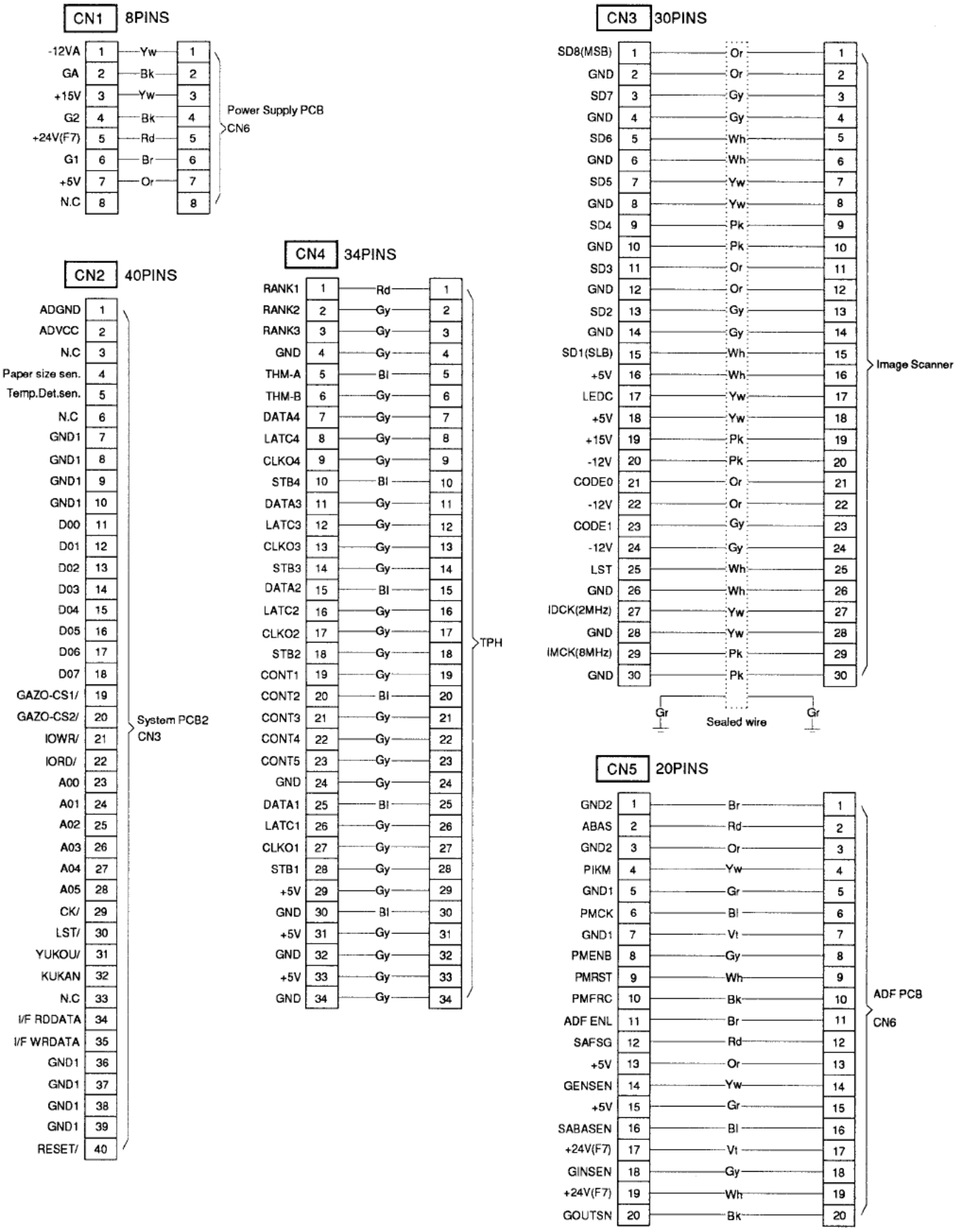


SW

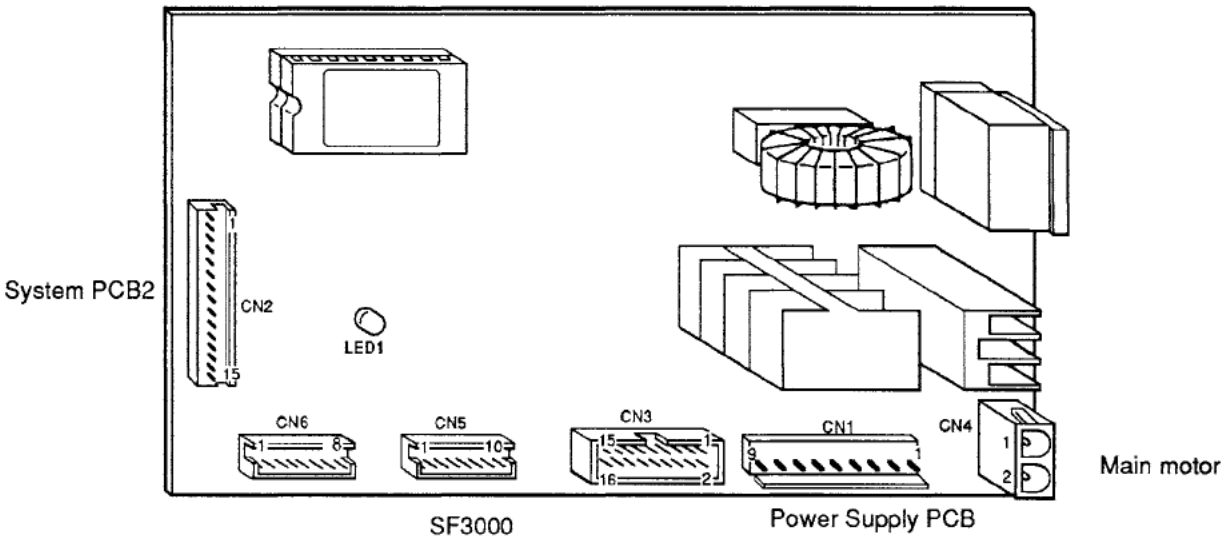
SW1(TPH) : For adjustment of heating power of Themal print head
SW2(GAN) : For Gamma compensation, i.e.contrast balance adjustment in image scanning
SW3(SLA) : For image elongation/shrinkage correction in image scanning
SW4(VPA) : Not Used

LED **- When LED is ON -**

LED 24V : +24V is supplied to PCB
LED +5V : +5V is supplied to PCB
LED -12V : -12V is supplied to PCB
LED +12V : +12V is supplied to PCB
INJ : " Read/Write Start Signal " is output.

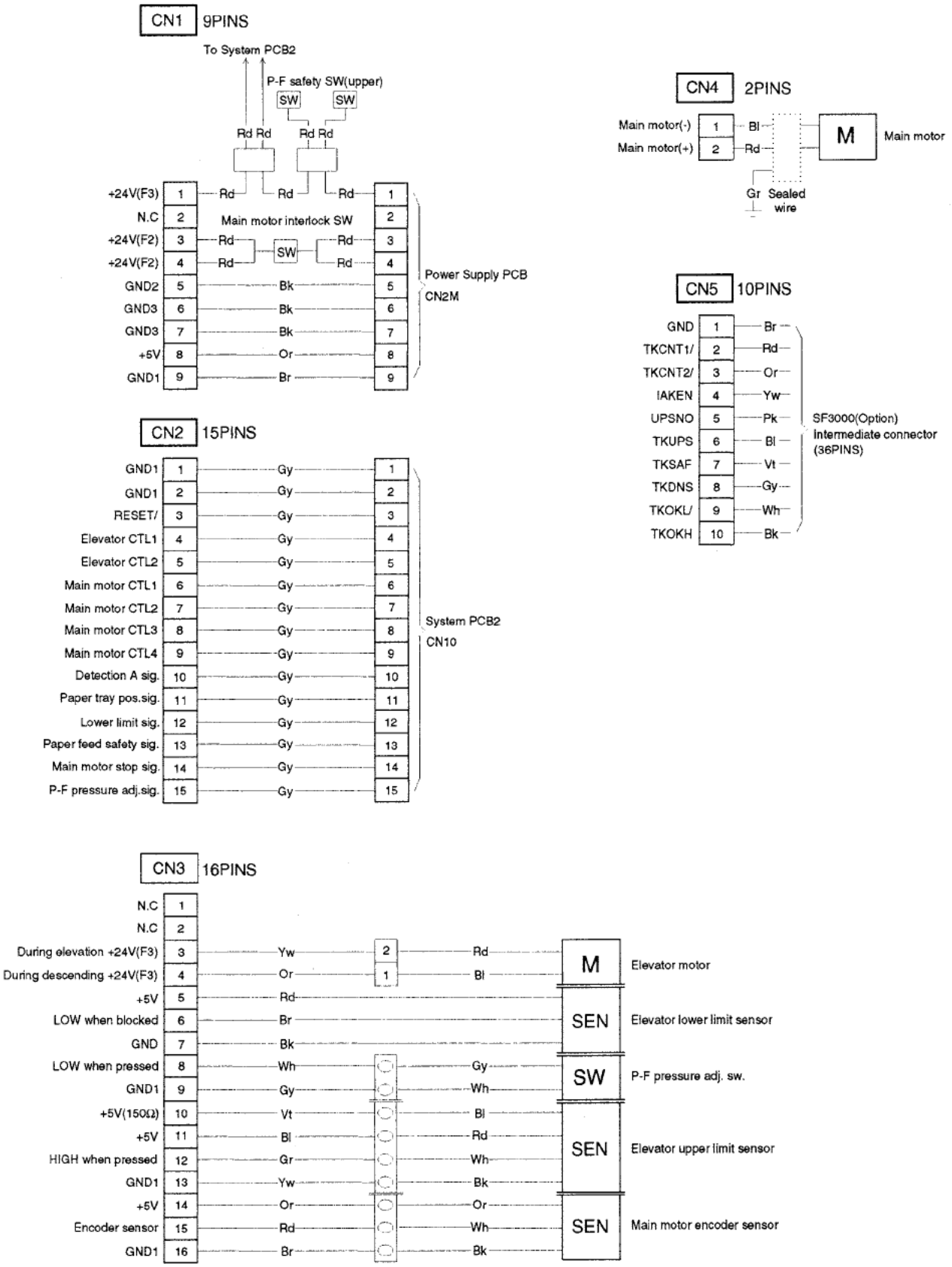

CN1 8PINS
-12VA 1 Yw 1
GA 2 Bk 2
+15V 3 Yw 3
G2 4 Bk 4
+24V(F7) 5 Rd 5
G1 6 Br 6
+5V 7 Or 7
N.C 8 8
Power Supply PCB
CN6
CN2 40PINS
ADGND 1
ADVCC 2
N.C 3
Paper size sen. 4
Temp.Det.sen. 5
N.C 6
GND1 7
GND1 8
GND1 9
GND1 10
D00 11
D01 12
D02 13
D03 14
D04 15
D05 16
D06 17
D07 18
GAZO-CS1/ 19
GAZO-CS2/ 20
IOWR/ 21
IORD/ 22
A00 23
A01 24
A02 25
A03 26
A04 27
A05 28
CK/ 29
LST/ 30
YUKOU/ 31
KUKAN 32
N.C 33
I/F RDDATA 34
I/F WRDATA 35
GND1 36
GND1 37
GND1 38
GND1 39
RESET/ 40
System PCB2
CN3
CN4 34PINS
RANK1 1 Rd 1
RANK2 2 Gy 2
RANK3 3 Gy 3
GND 4 Gy 4
THM-A 5 Bl 5
THM-B 6 Gy 6
DATA4 7 Gy 7
LATC4 8 Gy 8
CLKO4 9 Gy 9
STB4 10 Bl 10
DATA3 11 Gy 11
LATC3 12 Gy 12
CLKO3 13 Gy 13
STB3 14 Gy 14
DATA2 15 Bl 15
LATC2 16 Gy 16
CLKO2 17 Gy 17
STB2 18 Gy 18
CONT1 19 Gy 19
CONT2 20 Bl 20
CONT3 21 Gy 21
CONT4 22 Gy 22
CONT5 23 Gy 23
GND 24 Gy 24
DATA1 25 Bl 25
LATC1 26 Gy 26
CLKO1 27 Gy 27
STB1 28 Gy 28
+5V 29 Gy 29
GND 30 Bl 30
+5V 31 Gy 31
GND 32 Gy 32
+5V 33 Gy 33
GND 34 Gy 34
TPH
CN3 30PINS
SD8(MSB) 1 Or 1
GND 2 Or 2
SD7 3 Gy 3
GND 4 Gy 4
SD6 5 Wh 5
GND 6 Wh 6
SD5 7 Yw 7
GND 8 Yw 8
SD4 9 Pk 9
GND 10 Pk 10
SD3 11 Or 11
GND 12 Or 12
SD2 13 Gy 13
GND 14 Gy 14
SD1(SLB) 15 Wh 15
+5V 16 Wh 16
LEDC 17 Yw 17
+5V 18 Yw 18
+15V 19 Pk 19
-12V 20 Pk 20
CODE0 21 Or 21
-12V 22 Or 22
CODE1 23 Gy 23
-12V 24 Gy 24
LST 25 Wh 25
GND 26 Wh 26
IDCK(2MHz) 27 Yw 27
GND 28 Yw 28
IMCK(8MHz) 29 Pk 29
GND 30 Pk 30
Image Scanner
Gr
Sealed wire
Gr
CN5 20PINS
GND2 1 Br 1
ABAS 2 Rd 2
GND2 3 Or 3
PIKM 4 Yw 4
GND1 5 Gr 5
PMCK 6 Bl 6
GND1 7 Vt 7
PMENB 8 Gy 8
PMRST 9 Wh 9
PMFRC 10 Bk 10
ADF ENL 11 Br 11
SAFSG 12 Rd 12
+5V 13 Or 13
GENSEN 14 Yw 14
+5V 15 Gr 15
SABASEN 16 Bl 16
+24V(F7) 17 Vt 17
GINSEN 18 Gy 18
+24V(F7) 19 Wh 19
GOUTSN 20 Bk 20
ADF PCB
CN6

6. Motor Control PCB2

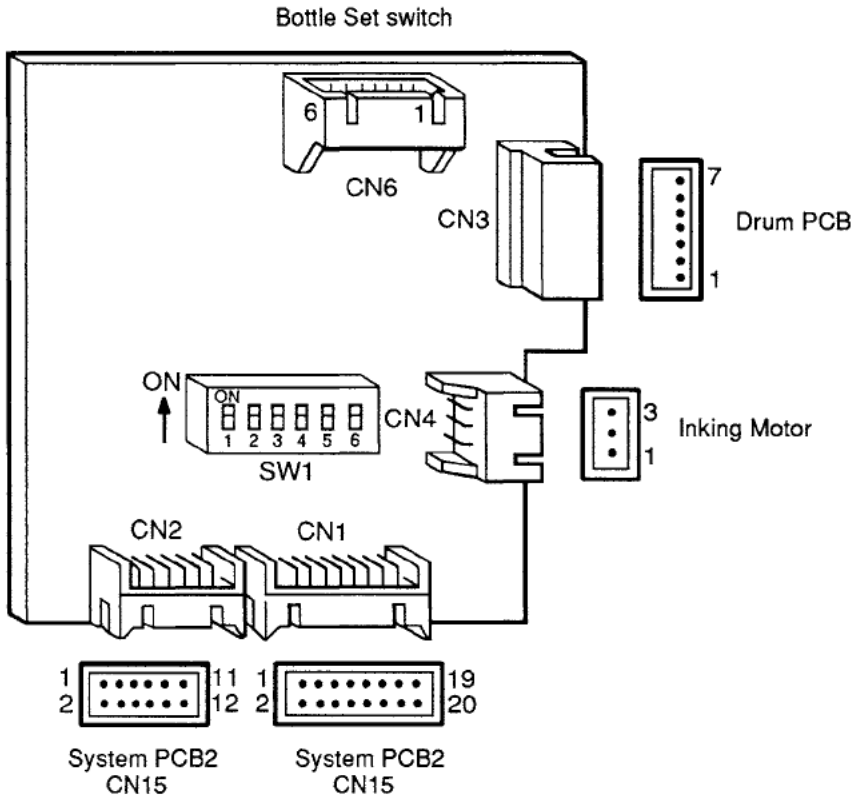


LED **- When LED is ON -**

LED 1: The actuator of Elevator upper limit sensor is raised to open the light path.


CN1 9PINS
To System PCB2
P-F safety SW(upper)
SW SW
Rd Rd Rd Rd
+24V(F3) 1 Rd Rd Rd 1
N.C 2 Main motor interlock SW 2
+24V(F2) 3 Rd SW Rd 3
+24V(F2) 4 Rd Rd 4
GND2 5 Bk 5
GND3 6 Bk 6
GND3 7 Bk 7
+5V 8 Or 8
GND1 9 Br 9
Power Supply PCB
CN2M
CN4 2PINS
Main motor(-) 1 Bl
Main motor(+) 2 Rd
M
Main motor
Gr Sealed wire
CN5 10PINS
GND 1 Br
TKCNT1/ 2 Rd
TKCNT2/ 3 Or
IAKEN 4 Yw
UPSNO 5 Pk
TKUPS 6 Bl
TKSAF 7 Vt
TKDNS 8 Gy
TKOKL/ 9 Wh
TKOKH 10 Bk
SF3000(Option)
Intermediate connector
(36PINS)
CN2 15PINS
GND1 1 Gy 1
GND1 2 Gy 2
RESET/ 3 Gy 3
Elevator CTL1 4 Gy 4
Elevator CTL2 5 Gy 5
Main motor CTL1 6 Gy 6
Main motor CTL2 7 Gy 7
Main motor CTL3 8 Gy 8
Main motor CTL4 9 Gy 9
Detection A sig. 10 Gy 10
Paper tray pos.sig. 11 Gy 11
Lower limit sig. 12 Gy 12
Paper feed safety sig. 13 Gy 13
Main motor stop sig. 14 Gy 14
P-F pressure adj.sig. 15 Gy 15
System PCB2
CN10
CN3 16PINS
N.C 1
N.C 2
During elevation +24V(F3) 3 Yw 2 Rd
During descending +24V(F3) 4 Or 1 Bl
M
Elevator motor
+5V 5 Rd
LOW when blocked 6 Br
SEN
Elevator lower limit sensor
GND 7 Bk
LOW when pressed 8 Wh Gy
GND1 9 Gy Wh
SW
P-F pressure adj. sw.
+5V(150Ω) 10 Vt Bl
+5V 11 Bl Rd
HIGH when pressed 12 Gr Wh
GND1 13 Yw Bk
SEN
Elevator upper limit sensor
+5V 14 Or Or
Encoder sensor 15 Rd Wh
GND1 16 Br Bk
SEN
Main motor encoder sensor

7. Drum Control PCB2

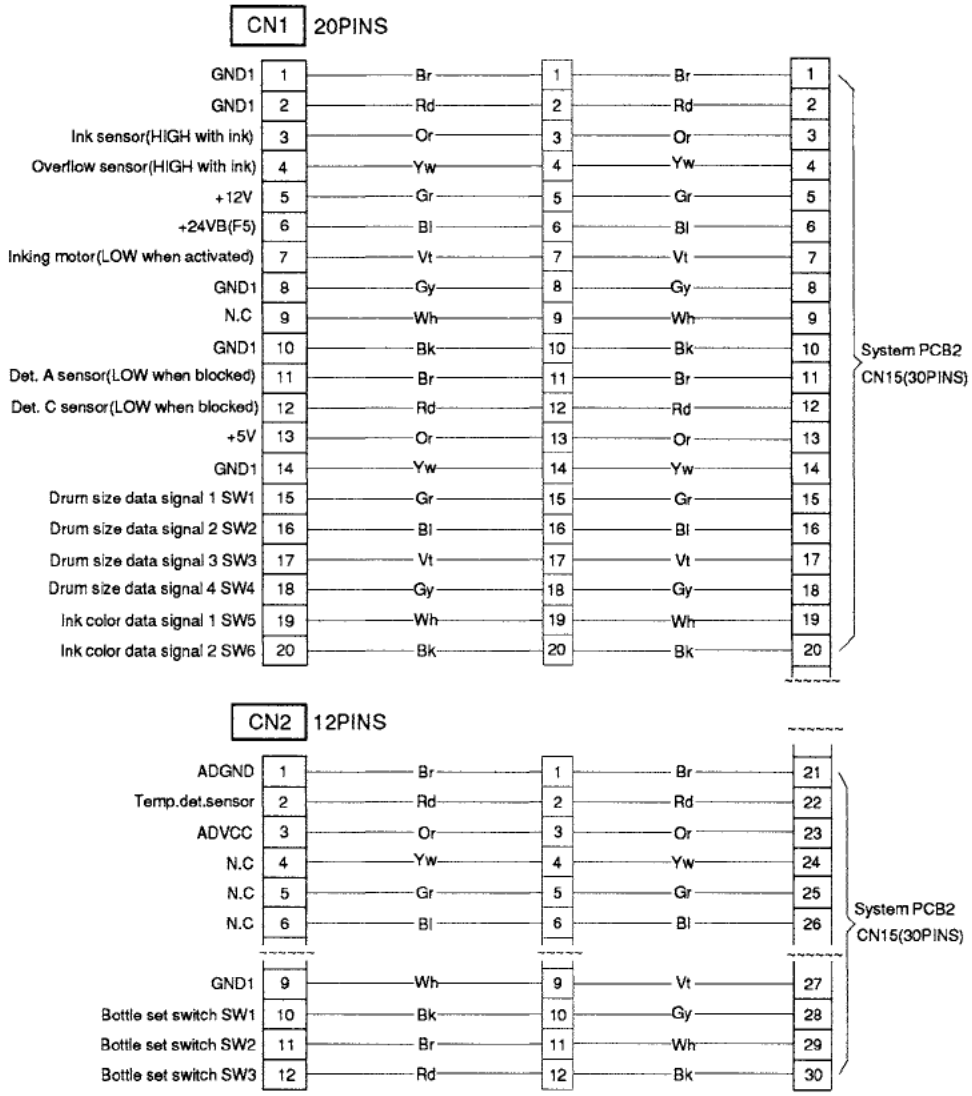


SW

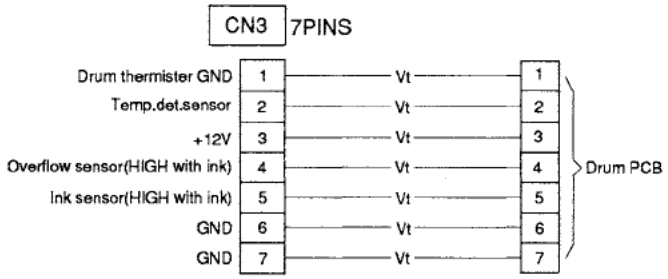
SW1 : Drum Data

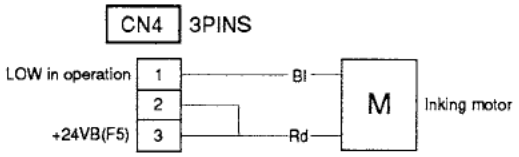
DATA	SW	SETTING		
Drum General Data		**STD**		
	1	OFF		
	2	OFF		
Drum Size Data (Legal/A4/B4)		**Legal**	**A4**	**B4**
	3	OFF	ON	ON
	4	OFF	ON	OFF
Drum Size Data (Ledger/A3)		**Ledger**	**A3**	**A4WIDE**
	3	ON	OFF	OFF
	4	OFF	OFF	ON
Ink Data		**Black**		**Color**
	5	OFF		ON
	6	OFF		OFF

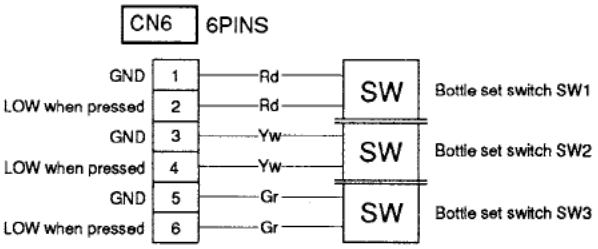
* A3/B4 selection will be made by model selection switch


CN1 20PINS
GND1 1 Br 1 Br 1
GND1 2 Rd 2 Rd 2
Ink sensor(HIGH with ink) 3 Or 3 Or 3
Overflow sensor(HIGH with ink) 4 Yw 4 Yw 4
+12V 5 Gr 5 Gr 5
+24VB(F5) 6 Bl 6 Bl 6
Inking motor(LOW when activated) 7 Vt 7 Vt 7
GND1 8 Gy 8 Gy 8
N.C 9 Wh 9 Wh 9
GND1 10 Bk 10 Bk 10
Det. A sensor(LOW when blocked) 11 Br 11 Br 11
Det. C sensor(LOW when blocked) 12 Rd 12 Rd 12
+5V 13 Or 13 Or 13
GND1 14 Yw 14 Yw 14
Drum size data signal 1 SW1 15 Gr 15 Gr 15
Drum size data signal 2 SW2 16 Bl 16 Bl 16
Drum size data signal 3 SW3 17 Vt 17 Vt 17
Drum size data signal 4 SW4 18 Gy 18 Gy 18
Ink color data signal 1 SW5 19 Wh 19 Wh 19
Ink color data signal 2 SW6 20 Bk 20 Bk 20
System PCB2
CN15(30PINS)

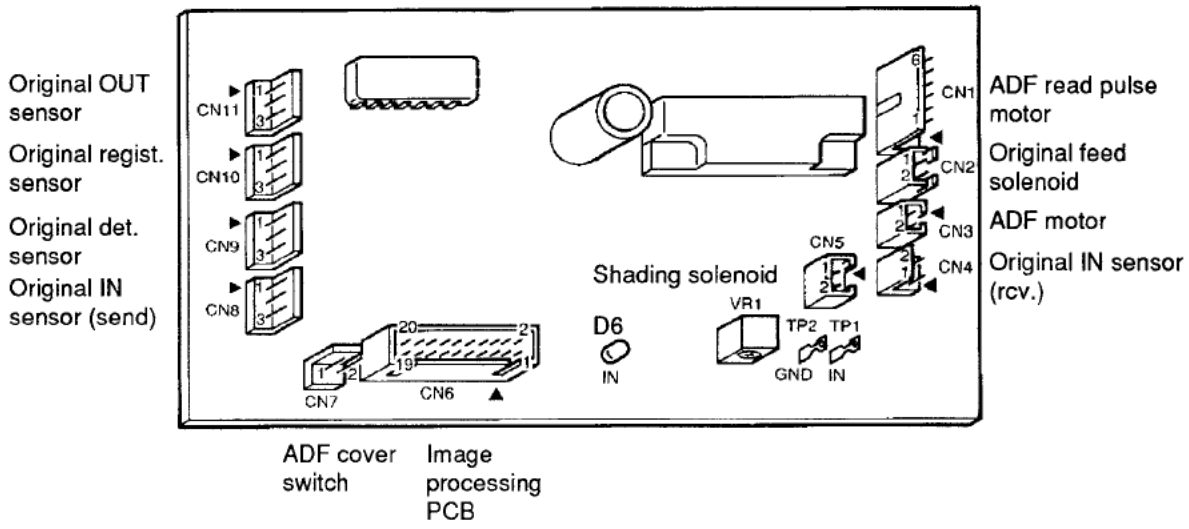
CN2 12PINS
ADGND 1 Br 1 Br 21
Temp.det.sensor 2 Rd 2 Rd 22
ADVCC 3 Or 3 Or 23
N.C 4 Yw 4 Yw 24
N.C 5 Gr 5 Gr 25
N.C 6 Bl 6 Bl 26
GND1 9 Wh 9 Vt 27
Bottle set switch SW1 10 Bk 10 Gy 28
Bottle set switch SW2 11 Br 11 Wh 29
Bottle set switch SW3 12 Rd 12 Bk 30
System PCB2
CN15(30PINS)


CN3 7PINS
Drum thermister GND 1 Vt 1
Temp.det.sensor 2 Vt 2
+12V 3 Vt 3
Overflow sensor(HIGH with ink) 4 Vt 4
Ink sensor(HIGH with ink) 5 Vt 5
GND 6 Vt 6
GND 7 Vt 7
Drum PCB


CN4 3PINS
LOW in operation 1 Bl
2
+24VB(F5) 3 Rd
M
Inking motor


CN6 6PINS
GND 1 Rd
LOW when pressed 2 Rd
SW
Bottle set switch SW1
GND 3 Yw
LOW when pressed 4 Yw
SW
Bottle set switch SW2
GND 5 Gr
LOW when pressed 6 Gr
SW
Bottle set switch SW3

8. ADF PCB



VR

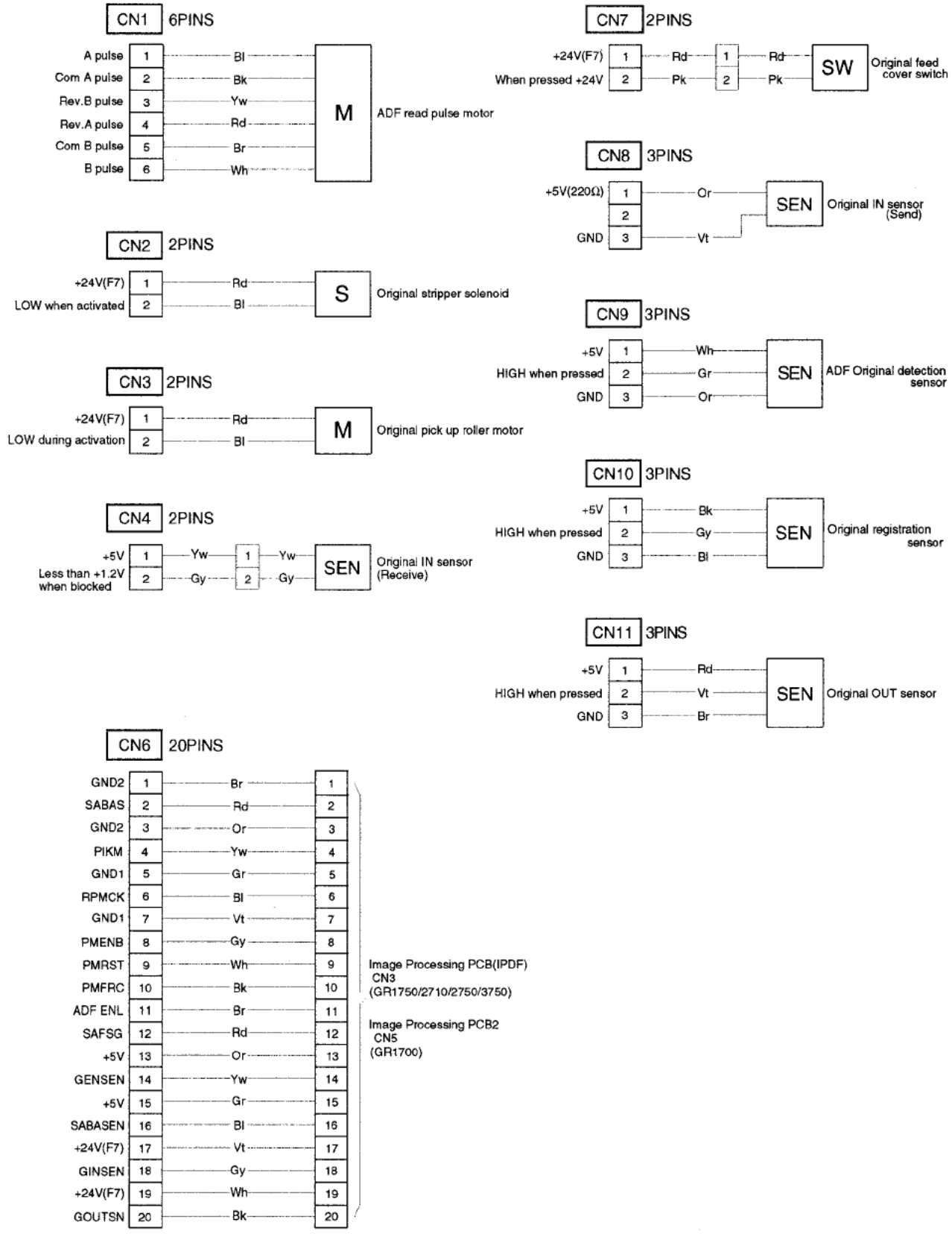
VR1 : For sensitivity adjustment of Original IN sensor (receive)

LED **- When LED is ON -**

D6 (IN) : The light path of the Original IN sensor is blocked.

TP

TP1 (IN) : For sensitivity adjustment of Original IN sensor
TP2 (GND) : For sensitivity adjustment of Original IN sensor


CN1 6PINS
A pulse 1 Bl
Com A pulse 2 Bk
Rev.B pulse 3 Yw
Rev.A pulse 4 Rd
Com B pulse 5 Br
B pulse 6 Wh
M
ADF read pulse motor
CN2 2PINS
+24V(F7) 1 Rd
LOW when activated 2 Bl
S
Original stripper solenoid
CN3 2PINS
+24V(F7) 1 Rd
LOW during activation 2 Bl
M
Original pick up roller motor
CN4 2PINS
+5V 1 Yw 1 Yw
Less than +1.2V when blocked 2 Gy 2 Gy
SEN
Original IN sensor (Receive)
CN7 2PINS
+24V(F7) 1 Rd 1 Rd
When pressed +24V 2 Pk 2 Pk
SW
Original feed cover switch
CN8 3PINS
+5V(220Ω) 1 Or
2
GND 3 Vt
SEN
Original IN sensor (Send)
CN9 3PINS
+5V 1 Wh
HIGH when pressed 2 Gr
GND 3 Or
SEN
ADF Original detection sensor
CN10 3PINS
+5V 1 Bk
HIGH when pressed 2 Gy
GND 3 Bl
SEN
Original registration sensor
CN11 3PINS
+5V 1 Rd
HIGH when pressed 2 Vt
GND 3 Br
SEN
Original OUT sensor
CN6 20PINS
GND2 1 Br 1
SABAS 2 Rd 2
GND2 3 Or 3
PIKM 4 Yw 4
GND1 5 Gr 5
RPMCK 6 Bl 6
GND1 7 Vt 7
PMENB 8 Gy 8
PMRST 9 Wh 9
PMFRC 10 Bk 10
ADF ENL 11 Br 11
SAFSG 12 Rd 12
+5V 13 Or 13
GENSEN 14 Yw 14
+5V 15 Gr 15
SABASEN 16 Bl 16
+24V(F7) 17 Vt 17
GINSEN 18 Gy 18
+24V(F7) 19 Wh 19
GOUTSN 20 Bk 20
Image Processing PCB(IPDF) CN3 (GR1750/2710/2750/3750)
Image Processing PCB2 CN5 (GR1700)

9. Flat Bed PCB (GR2710/2750/3750)

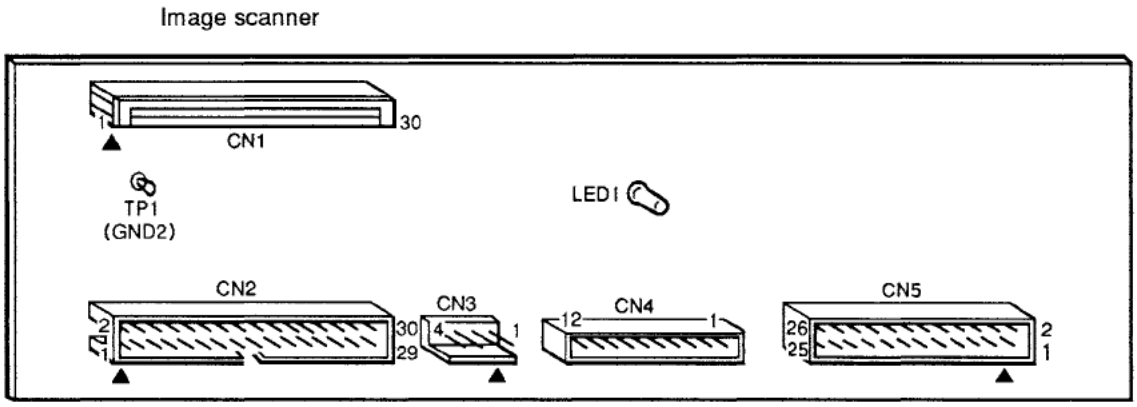


Image processing PCB(IPDF) CN2 (GR2710/ 2750/3750)

Flat bed read pulse motor

Various sensors

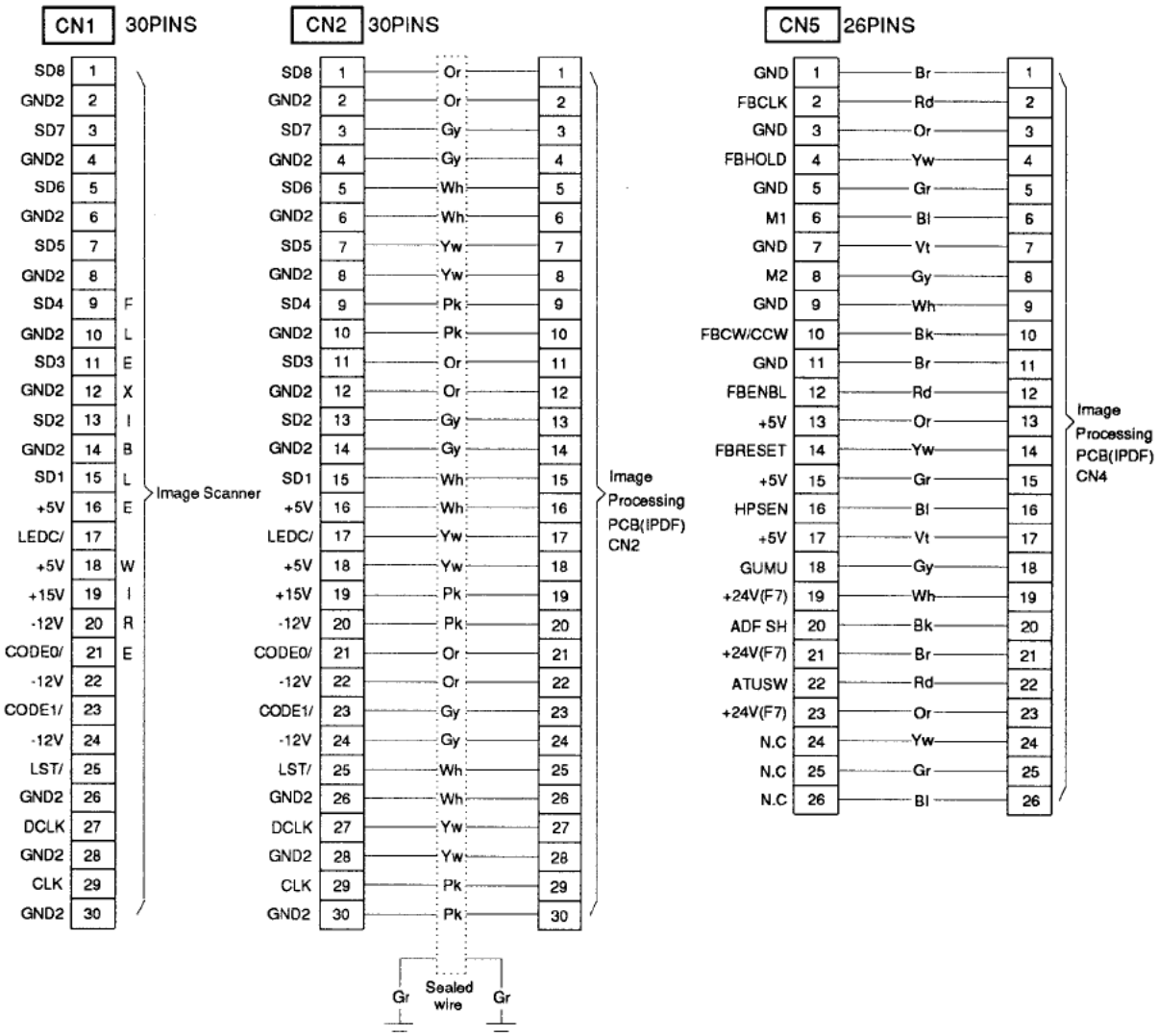
Image processing PCB(IPDF) CN4 (GR2710/2750/3750)

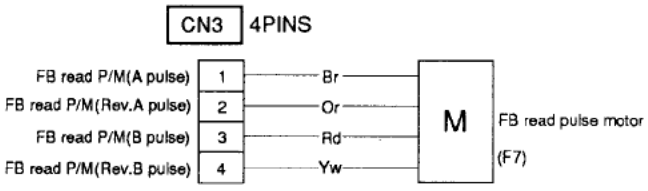
LED **- When LED is ON -**

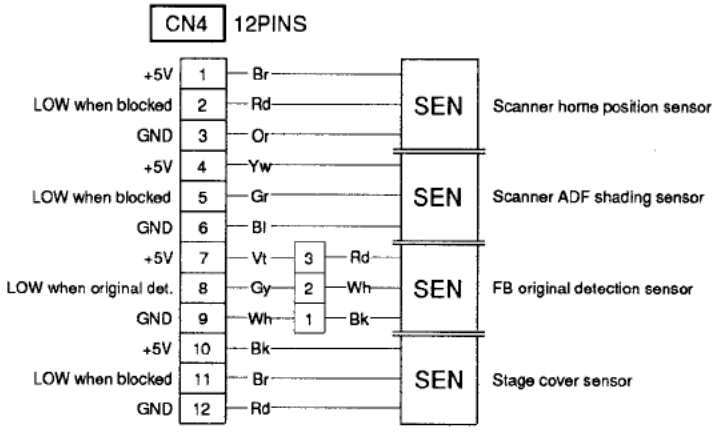
LED 1 : The Flat bed original detection senosr is detecting an original. (The sensor is detecting the reflected light)

TP

TP1 : GND 2

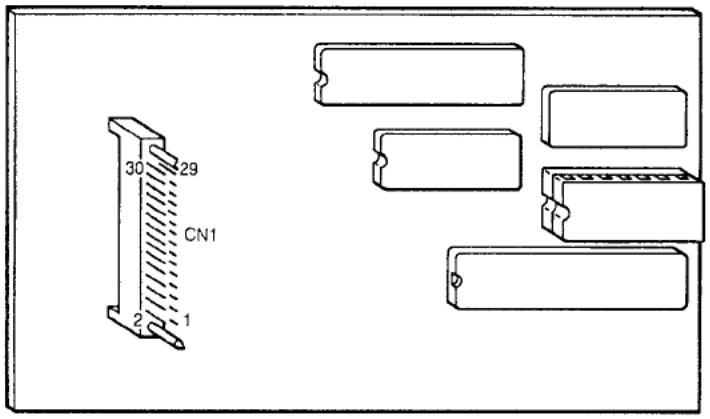

CN1 30PINS
CN2 30PINS
CN5 26PINS
Image Scanner
Image Processing PCB(IPDF) CN2
Image Processing PCB(IPDF) CN4
Sealed wire
Gr
Gr


CN3 4PINS
FB read P/M(A pulse)
FB read P/M(Rev.A pulse)
FB read P/M(B pulse)
FB read P/M(Rev.B pulse)
M
FB read pulse motor (F7)


CN4 12PINS
LOW when blocked
LOW when original det.
SEN
Scanner home position sensor
Scanner ADF shading sensor
FB original detection sensor
Stage cover sensor

10.Trimming PCB2 (GR2750 & 3750)

Image Processing PCB(IPDF)
CN8
(GR2750/3750)

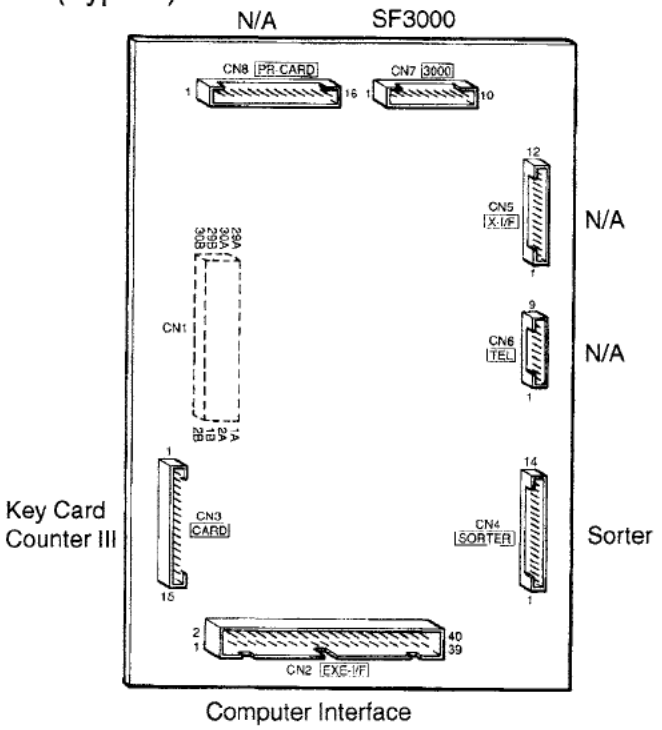


CN1 30PINS

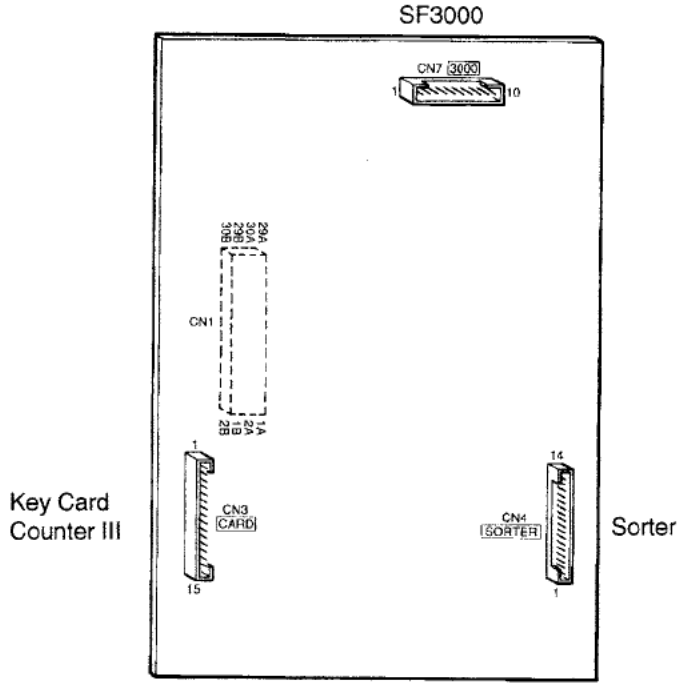
+5V	1	Image Processing PCB(IPDF) CN8
+5V	2	
/LST	3	
VCK	4	
/YUKOU	5	
/SOUT	6	
/WHITE	7	
/PS	8	
/R/W-START	9	
/S/K-SIG	10	
/BUSY/RDY	11	
/END	12	
SIZE1	13	
SIZE2	14	
SIZE3	15	
/MS	16	
/CLEAR	17	
/TOP	18	
	19	
/SM	20	
/PHOTO	21	
/CP	22	
GND	23	
GND	24	
GND	25	
GND	26	
GND	27	
GND	28	
GND	29	
GND	30	

11. Option PCB

(Type A)



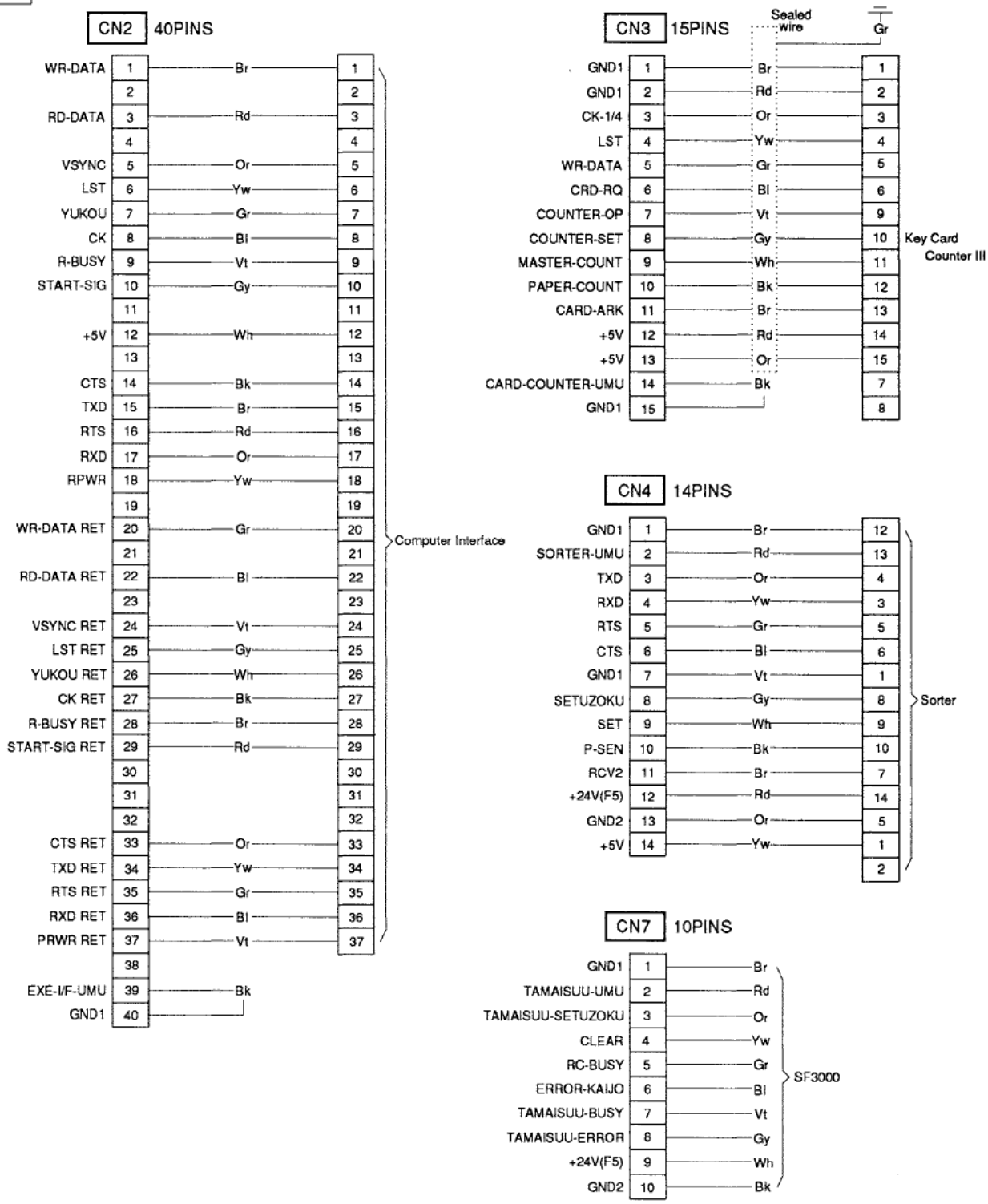
(Type B)



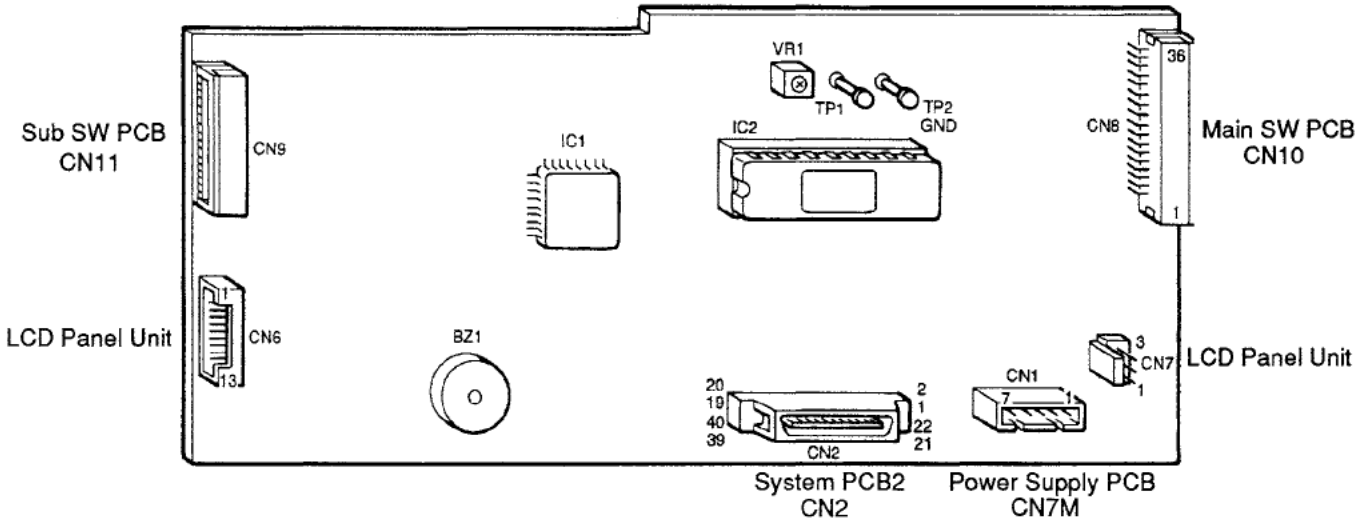
CN1 60PINS

GND1	A1	
GND1	B1	
GND1	A2	
GND1	B2	
GND1	A3	
GND1	B3	
+5V	A4	
+5V	B4	
+5V	A5	
+5V	B5	
GND2	A6	
GND2	B6	
GND2	A7	
+24V(F5)	B7	
+24V(F5)	A8	
+24V(F5)	B8	
TXD1	A9	
RXD1	B9	
RTS1/	A10	
CTS1/	B10	
TXD2	A11	
RXD2	B11	
RTS2/	A12	
CTS2/	B12	
TXD3	A13	
RXD3	B13	
RTS3/	A14	
CTS3/	B14	
I/F PCB set sig.	A15	System PCB2
Paper sensor sig.	B15	CN6
Paper sensor rcv.2 sig.	A16	
MASTER-COUNT	B16	
PAPER-COUNT	A17	
CK/	B17	
LST/	A18	
YUKOU/	B18	
	A19	
I/F-RD DATE	B19	
I/F-WR DATE	A20	
	B20	
D00	A21	
D01	B21	
D02	A22	
D03	B22	
D04	A23	
D05	B23	
D06	A24	
D07	B24	
A00	A25	
A01	B25	
A02	A26	
A03	B26	
	A27	
	B27	
	A28	
	B28	
CS/	A29	
RD/	B29	
WR/	A30	
RESET	B30	

Option PCB


CN2 40PINS
WR-DATA 1 Br 1
2 2
RD-DATA 3 Rd 3
4 4
VSYNC 5 Or 5
LST 6 Yw 6
YUKOU 7 Gr 7
CK 8 Bl 8
R-BUSY 9 Vt 9
START-SIG 10 Gy 10
11 11
+5V 12 Wh 12
13 13
CTS 14 Bk 14
TXD 15 Br 15
RTS 16 Rd 16
RXD 17 Or 17
RPWR 18 Yw 18
19 19
WR-DATA RET 20 Gr 20
21 21
RD-DATA RET 22 Bl 22
23 23
VSYNC RET 24 Vt 24
LST RET 25 Gy 25
YUKOU RET 26 Wh 26
CK RET 27 Bk 27
R-BUSY RET 28 Br 28
START-SIG RET 29 Rd 29
30 30
31 31
32 32
CTS RET 33 Or 33
TXD RET 34 Yw 34
RTS RET 35 Gr 35
RXD RET 36 Bl 36
PRWR RET 37 Vt 37
38
EXE-I/F-UMU 39 Bk
GND1 40
Computer Interface
CN3 15PINS
Sealed wire
Gr
GND1 1 Br 1
GND1 2 Rd 2
CK-1/4 3 Or 3
LST 4 Yw 4
WR-DATA 5 Gr 5
CRD-RQ 6 Bl 6
COUNTER-OP 7 Vt 9
COUNTER-SET 8 Gy 10
MASTER-COUNT 9 Wh 11
PAPER-COUNT 10 Bk 12
CARD-ARK 11 Br 13
+5V 12 Rd 14
+5V 13 Or 15
CARD-COUNTER-UMU 14 Bk 7
GND1 15 8
Key Card Counter III
CN4 14PINS
GND1 1 Br 12
SORTER-UMU 2 Rd 13
TXD 3 Or 4
RXD 4 Yw 3
RTS 5 Gr 5
CTS 6 Bl 6
GND1 7 Vt 1
SETUZOKU 8 Gy 8
SET 9 Wh 9
P-SEN 10 Bk 10
RCV2 11 Br 7
+24V(F5) 12 Rd 14
GND2 13 Or 5
+5V 14 Yw 1
2
Sorter
CN7 10PINS
GND1 1 Br
TAMAISUU-UMU 2 Rd
TAMAISUU-SETUZOKU 3 Or
CLEAR 4 Yw
RC-BUSY 5 Gr
ERROR-KAIJO 6 Bl
TAMAISUU-BUSY 7 Vt
TAMAISUU-ERROR 8 Gy
+24V(F5) 9 Wh
GND2 10 Bk
SF3000

12. LCD Control PCB



LCD Control PCB

CN1 7PINS

+5V	1	Rd	1	Power Supply PCB CN7M
+5V	2	Rd	2	
GND1	3	Bk	3	
GND1	4	Bk	4	
+12V	5	Yw	5	
-12V	6	Yw	6	
PF/	7	Wh	7	

CN2 40PINS

D00	A1	Rd	A20	System PCB2 CN2
GND1	A2	Gy	A19	
D01	A3	Gy	A18	
GND1	A4	Gy	A17	
D02	A5	Bl	A16	
GND1	A6	Gy	A15	
D03	A7	Gy	A14	
GND1	A8	Gy	A13	
D04	A9	Gy	A12	
GND1	A10	Bl	A11	
D05	A11	Gy	A10	
GND1	A12	Gy	A9	
D06	A13	Gy	A8	
GND1	A14	Gy	A7	
D07	A15	Bl	A6	
GND1	A16	Gy	A5	
A00	A17	Gy	A4	
GND1	A18	Gy	A3	
A01	A19	Gy	A2	
GND1	A20	Bl	A1	
A02	B1	Rd	B20	
GND1	B2	Gy	B19	
PNL-CS/	B3	Gy	B18	
GND1	B4	Gy	B17	
IORD/	B5	Bl	B16	
GND1	B6	Gy	B15	
IOWR/	B7	Gy	B14	
GND1	B8	Gy	B13	
RESET/	B9	Gy	B12	
GND1	B10	Bl	B11	
IREQ/	B11	Gy	B10	
GND1	B12	Gy	B9	
PNL-EN/	B13	Gy	B8	
GND1	B14	Gy	B7	
WAIT	B15	Bl	B6	
GND1	B16	Gy	B5	
BUSY	B17	Gy	B4	
GND1	B18	Gy	B3	
N.C	B19	Gy	B2	
N.C	B20	Bl	B1	

CN9 26PINS

GND	1		1	Sub SW PCB CN11
GND	2		2	
GND	3		3	
+5V	4		4	
DISP-EN	5		5	
SK5	6		6	
SK4	7	F	7	
SK3	8	L	8	
SK2	9	E	9	
RL7	10	X	10	
RL6	11	I	11	
RL5	12	B	12	
RL2	13	L	13	
RL1	14	E	14	
RL0	15		15	
SL10	16	W	16	
SL8	17	I	17	
SL4	18	R	18	
OUT4	19	E	19	
OUT5	20		20	
OUT6	21		21	
OUT7	22		22	
OUT0	23		23	
OUT1	24		24	
OUT2	25		25	
OUT3	26		26	

CN8 36PINS

OUT0	1		1	Main SW PCB CN10
OUT1	2		2	
OUT2	3		3	
OUT3	4		4	
OUT4	5		5	
OUT5	6		6	
OUT6	7		7	
OUT7	8		8	
SL0	9		9	
SL1	10		10	
SL2	11	F	11	
SL3	12	L	12	
SL5	13	E	13	
SL6	14	X	14	
SL7	15	I	15	
SL9	16	B	16	
SK0	17	L	17	
SK1	18	E	18	
SK2	19		19	
SK3	20	W	20	
SK4	21	I	21	
SK5	22	R	22	
RL0	23	E	23	
RL1	24		24	
RL2	25		25	
RL3	26		26	
RL4	27		27	
RL5	28		28	
RL6	29		29	
RL7	30		30	
+5V	31		31	
+5V	32		32	
GND	33		33	
GND	34		34	
GND	35		35	
DISP-EN	36		36	

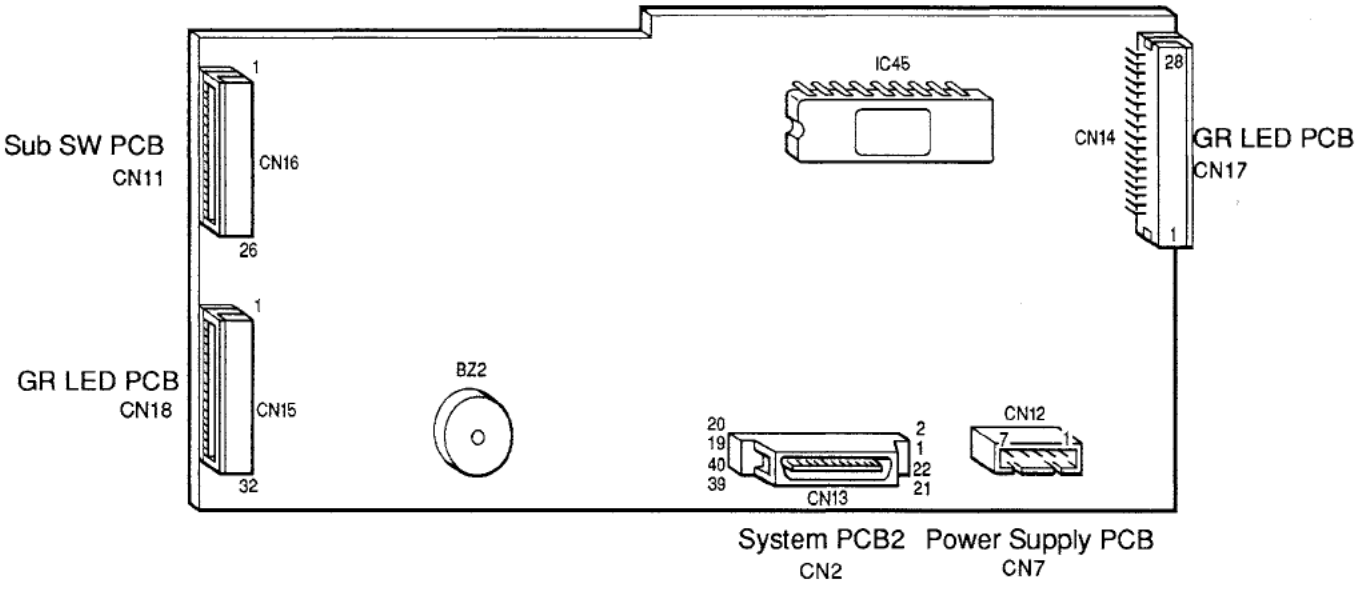
CN6 13PINS

D3	1	Wh	LCD Panel Unit
D2	2	Wh	
D1	3	Wh	
D0	4	Wh	
FLM	5	Wh	
M	6	Wh	
CL1	7	Wh	
CL2	8	Wh	
N.C	9	Wh	
+5V	10	Wh	
GND	11	Wh	
-12V	12	Wh	
Vo	13	Wh	

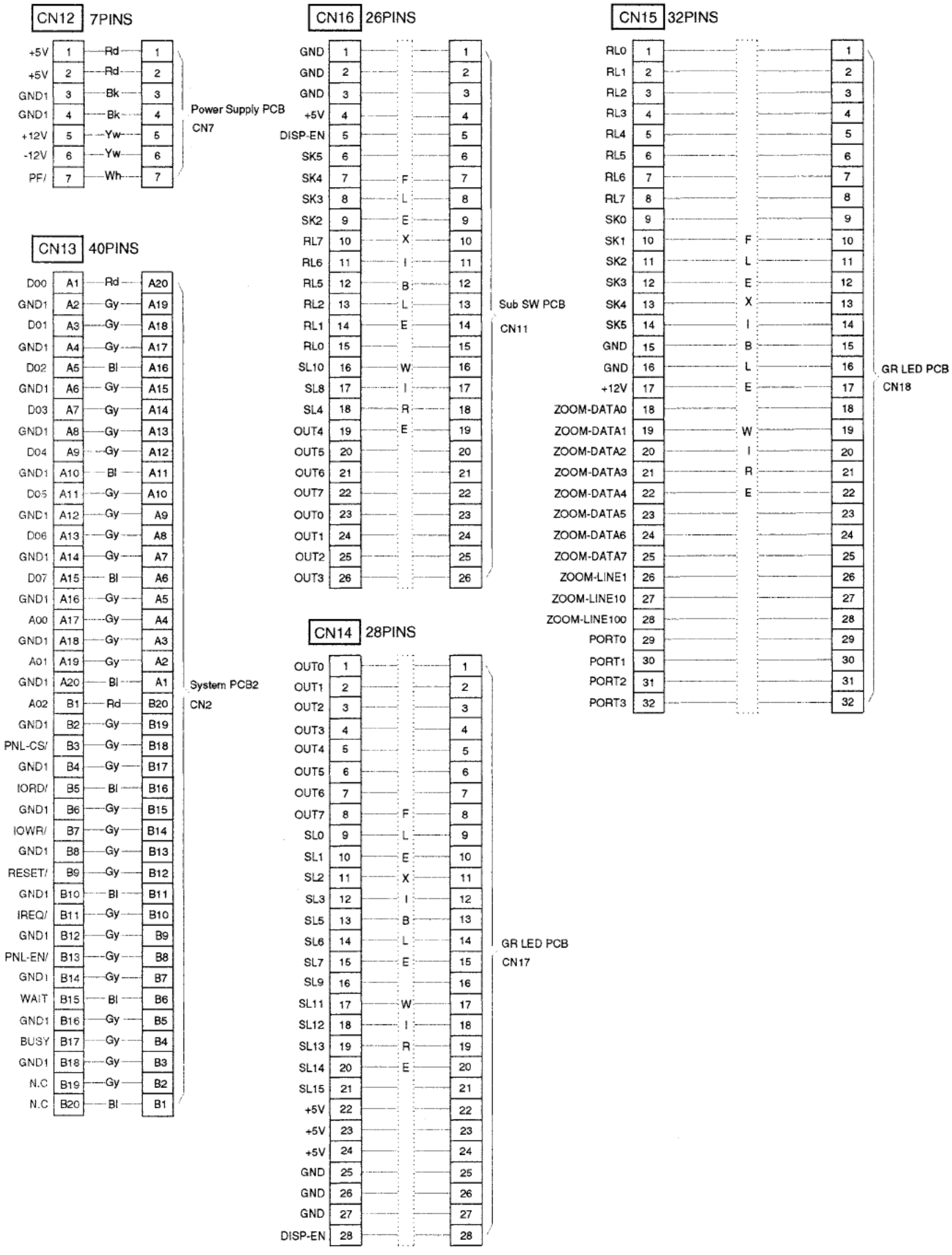
CN7 3PINS

ACVOUT1	1	Wh	
N.C	2		
COM-OUT	3	Wh	

13. LED Control PCB



LED Control PCB



14.Power Supply PCB

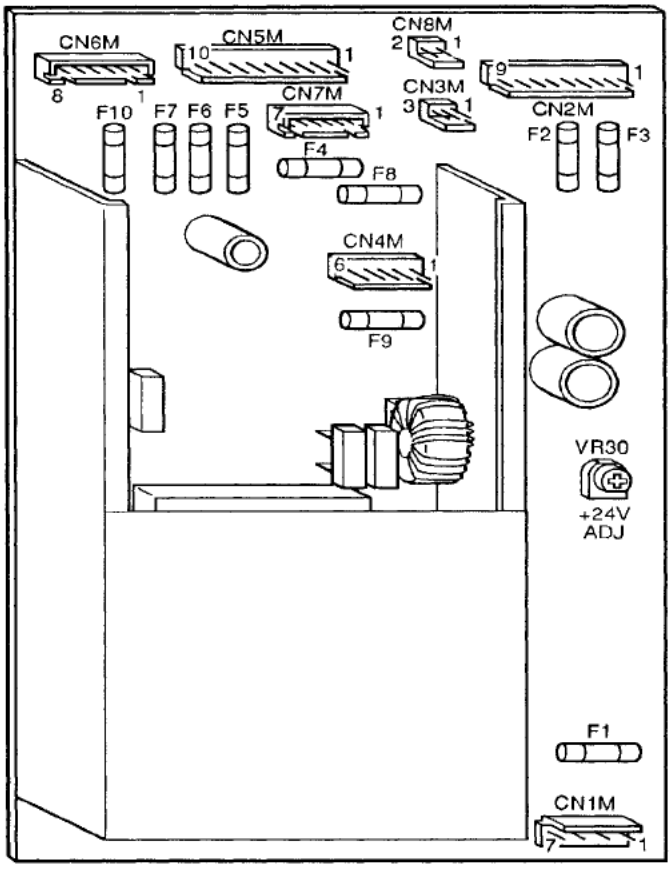
FUSE REPLACEMENT

CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE,
REPLACE ONLY WITH SAME TYPE AND RATINGS OF FUSE(S).

Power Supply Model	120V Type		220-240V Type	
	019-51006-A 019-51014-A	019-51022-A	019-51007-A	019-51023-A
F1	10A 125V	10A 125V	T 5A 250V	T 5A 250V
F2	8A 125V	8A 125V	T 6.3A 250V	T 6.3A 250V
F3	1A 125V	3.15A 125V	T 1A 250V	T3.15A 250V
F4	3.15A 125V	3.15A 125V	T3.15A 250V	T3.15A 250V
F5	3.15A 125V	3.15A 125V	T3.15A 250V	T3.15A 250V
F6	3.15A 125V	3.15A 125V	T3.15A 250V	T3.15A 250V
F7	3.15A 125V	3.15A 125V	T3.15A 250V	T3.15A 250V
F8	1A 125V	None	T 1A 250V	None
F9	3.15A 125V	None	T3.15A 250V	None
F10	3.15A 125V	None	T3.15A 250V	None
F201	None	3.15A 125V	None	3.15A 125V
F202	None	3.15A 125V	None	3.15A 125V
F301	None	3.15A 125V	None	3.15A 125V

Power Supply PCB(H)

Power Supply PCB(H100/200)



CN

CN1 : From Main power switch
CN2 : To Motor Control PCB2
CN3 : To Suction fan
CN4 : To TPH Power PCB
CN5 : To System PCB2
CN6 : To Image Processing PCB
CN7 : To LCD or LED Control PCB
CN8 : To Power Supply fan

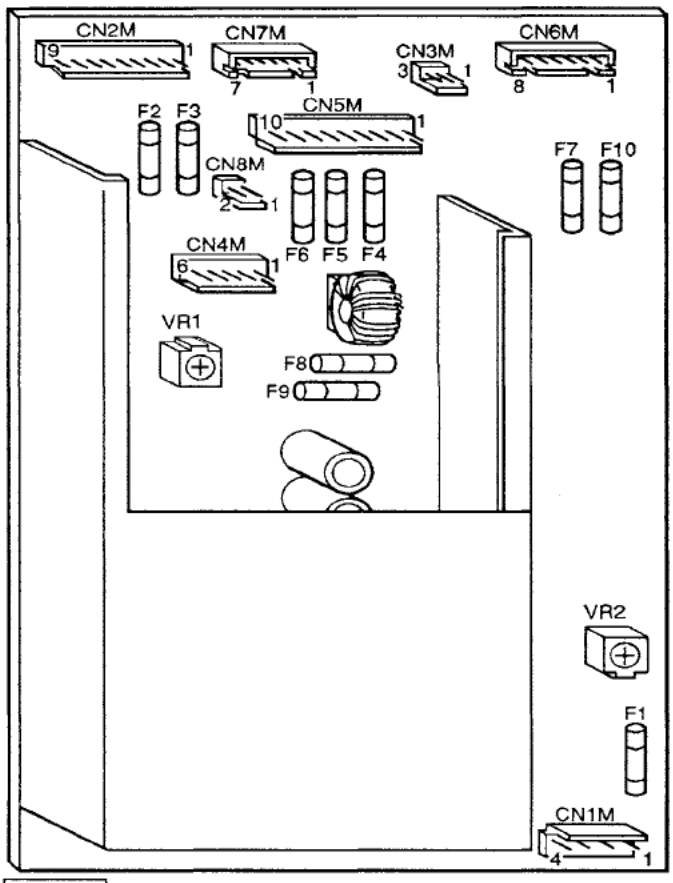
VR

VR30: For adjustment of +24V output.

FUSE

	120V Type	220-240V Type	Voltage/Pin number	Area
F1	10A 125V	T 5A 250V	Main Fuse	AC Input Voltage
F2	8A 125V	T 6.3A 250V	+24V(CN2M,Pins 3 & 4)	Motor Control PCB2
F3	1A 125V	T 1A 250V	+24V(CN2M,Pin1)	Motor Control PCB2
F4	3.15A 125V	T3.15A 250V	+24VA(CN5M,Pin7)	System PCB2 A-System
F5	3.15A 125V	T3.15A 250V	+24VB(CN5M,Pin8)	System PCB2 B-System
F6	3.15A 125V	T3.15A 250V	+24VC(CN5M,Pin9)	System PCB2 C-System
F7	3.15A 125V	T3.15A 250V	+24VD(CN6M,Pin5)	Image Processing PCB
F8	1A 125V	T 1A 250V	+24V(CN3M,CN8M)	Suction fan motor,Power Supply fan motor
F9	3.15A 125V	T3.15A 250V	+5V(CN2M,Pin8)	Motor Control PCB2
			(CN5M,Pin1)	System PCB2
			(CN6M,Pin7)	Image Processing PCB
			(CN7M,Pin 1 & 2)	LCD Control PCB or LED Control PCB
			+12V(CN5M,Pin3)	System PCB2
			(CN6M,Pin8)	Image Processing PCB
			(CN7M,Pin5)	LCD Control PCB or LED Control PCB
			+15V(CN6M,Pin3)	Image Processing PCB
F10	3.15A 125V	T3.15A 250V	-12V(CN6M,Pin1)	Image Processing PCB
			(CN7M,Pin6)	LCD Control PCB or LED Control PCB

Power Supply PCB(S100)



CN

CN1 : From Main power switch
CN2 : To Motor Control PCB2
CN3 : To Suction fan
CN4 : To TPH Power PCB
CN5 : To System PCB2
CN6 : To Image Processing PCB
CN7 : To LCD or LED Control PCB
CN8 : To Power Supply fan

VR

VR1: For adjustment of +5V output

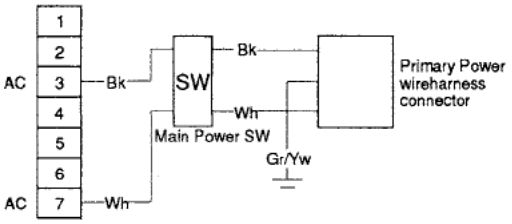
VR2: For adjustment of +24V output

FUSE

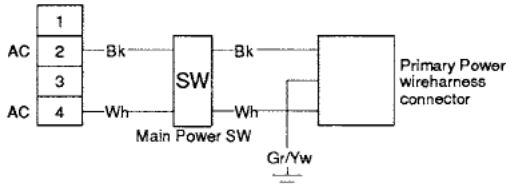
	120V Type	Voltage/Pin number	Area
F1	10A 125V	Main Fuse	AC Input Voltage
F2	8A 125V	+24V(CN2M,Pins 3 & 4)	Motor Control PCB2
F3	1A 125V	+24V(CN2M,Pin1)	Motor Control PCB2
F4	3.15A 125V	+24VA(CN5M,Pin7)	System PCB2 A-System
F5	3.15A 125V	+24VB(CN5M,Pin8)	System PCB2 B-System
F6	3.15A 125V	+24VC(CN5M,Pin9)	System PCB2 C-System
F7	3.15A 125V	+24VD(CN6M,Pin5)	Image Processing PCB
F8	1A 125V	+24V(CN3M,CN8M)	Suction fan motor,Power Supply fan motor
F9	3.15A 125V	+5V(CN2M,Pin8) (CN5M,Pin1) (CN6M,Pin7) (CN7M,Pin 1 & 2)	Motor Control PCB2 System PCB2 Image Processing PCB LCD Control PCB or LED Control PCB
		+12V(CN5M,Pin3) (CN6M,Pin8) (CN7M,Pin5)	System PCB2 Image Processing PCB LCD Control PCB or LED Control PCB
F10	3.15A 125V	-12V(CN6M,Pin1) (CN7M,Pin6)	Image Processing PCB LCD Control PCB or LED Control PCB

Power Supply PCB

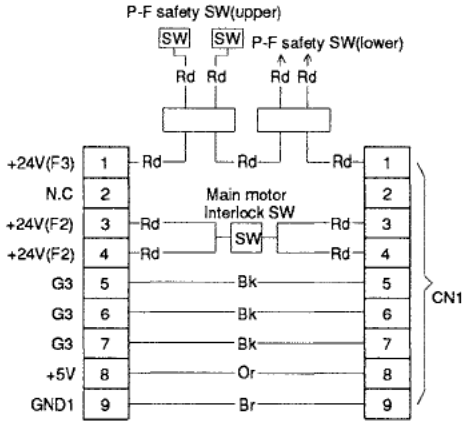
CN1M 7PINS(H100/200)



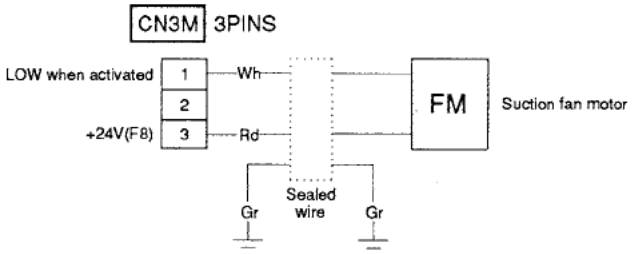
CN1M 4PINS(S100)



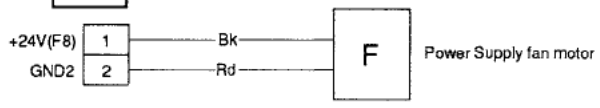
CN2M 9PINS



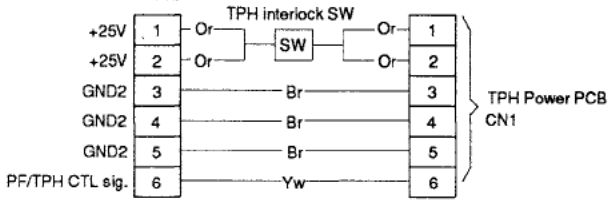
CN3M 3PINS



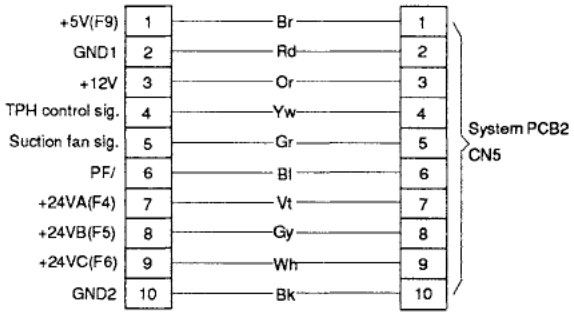
CN8M 2PINS



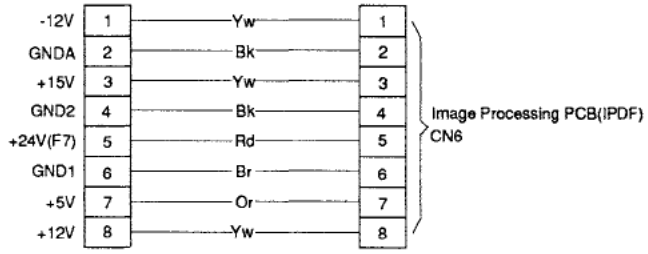
CN4M 6PINS



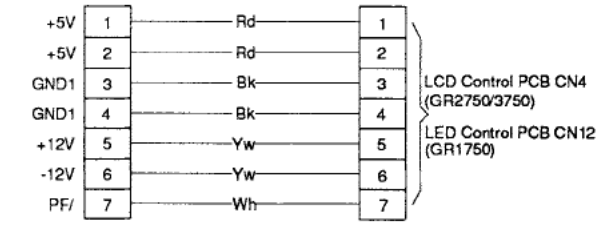
CN5M 10PINS



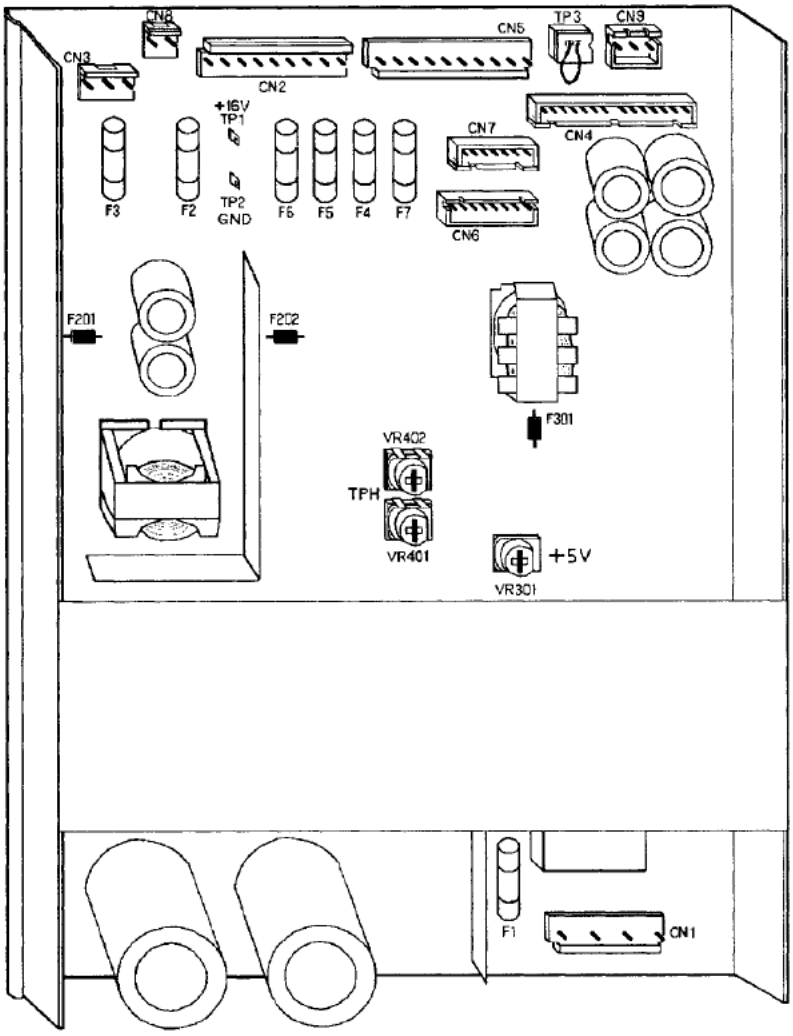
CN6M 8PINS



CN7M 7PINS



Power Supply PCB(N100/200)



CN

CN1 : From Main power switch
CN2 : To Motor Control PCB2
CN3 : To Suction fan
CN4 : To TPH
CN5 : To System PCB2
CN6 : To Image Processing PCB
CN7 : To LED Control PCB
CN8 : To Power Supply fan
CN9 : For adjusting TPH voltage

VR

VR301: For adjustment of +5V output
(Factory adjustment only)
VR401/402
: For adjustment of TPH voltage

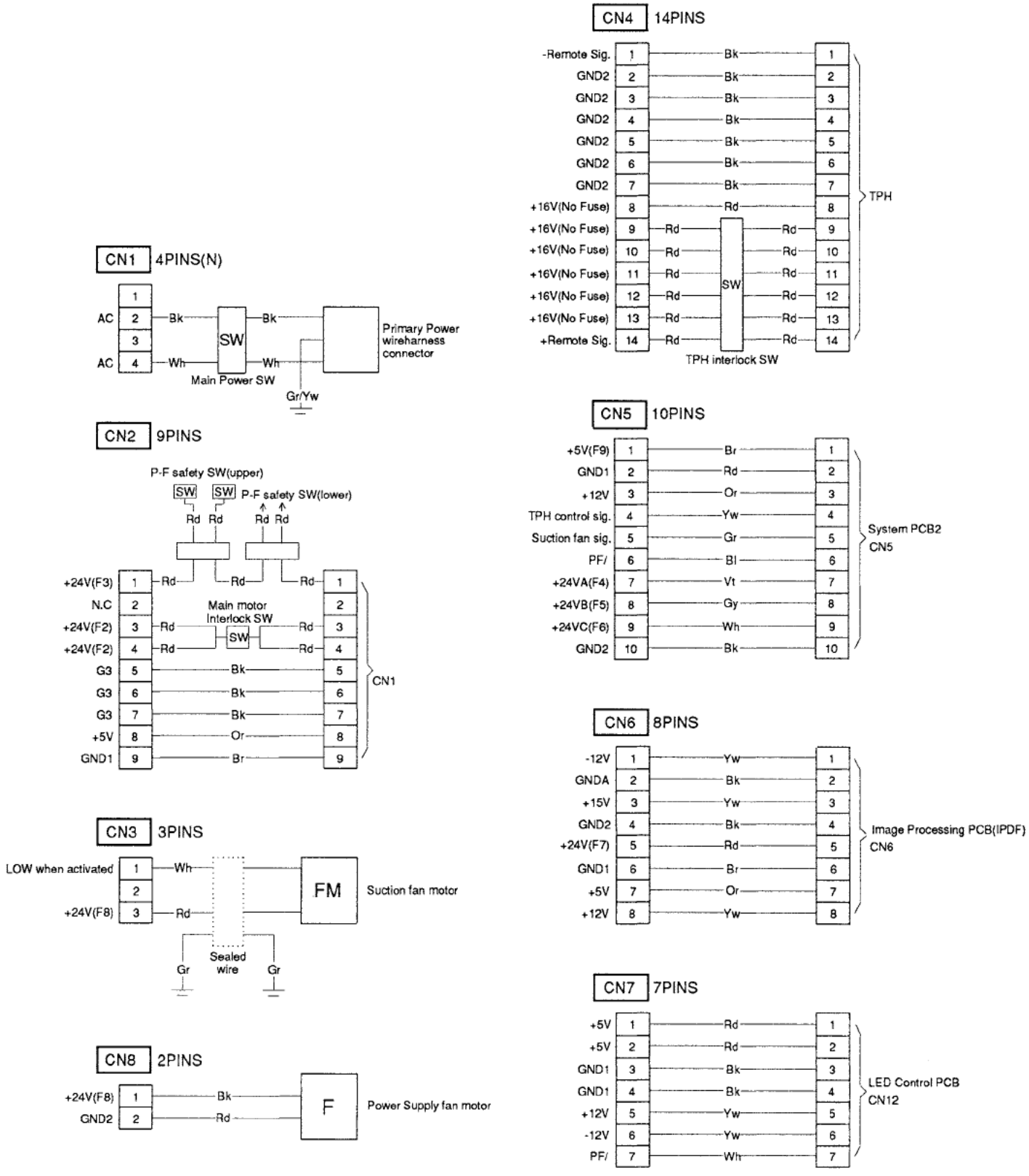
TP

TP1: +16V
TP2: GND
TP3: TPH input voltage
(disconnect when adjusting TPHpower)

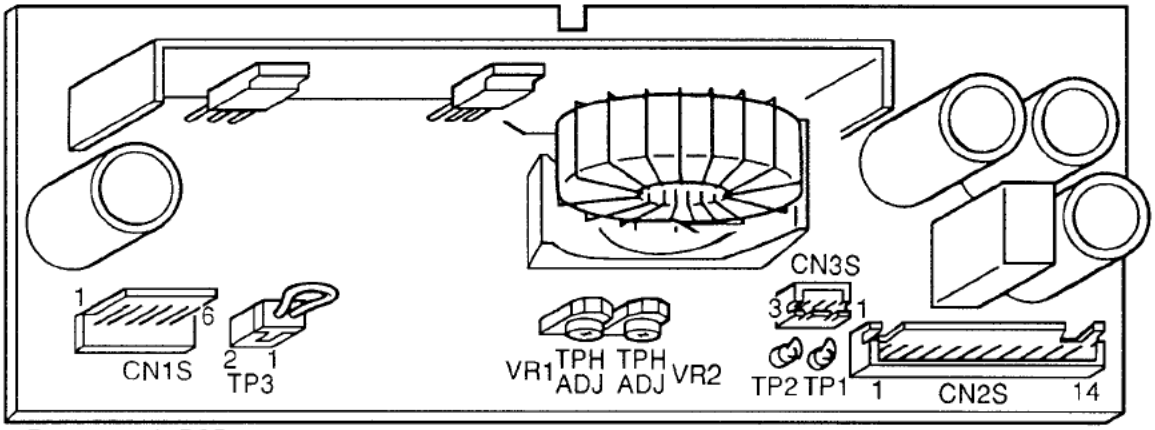
FUSE

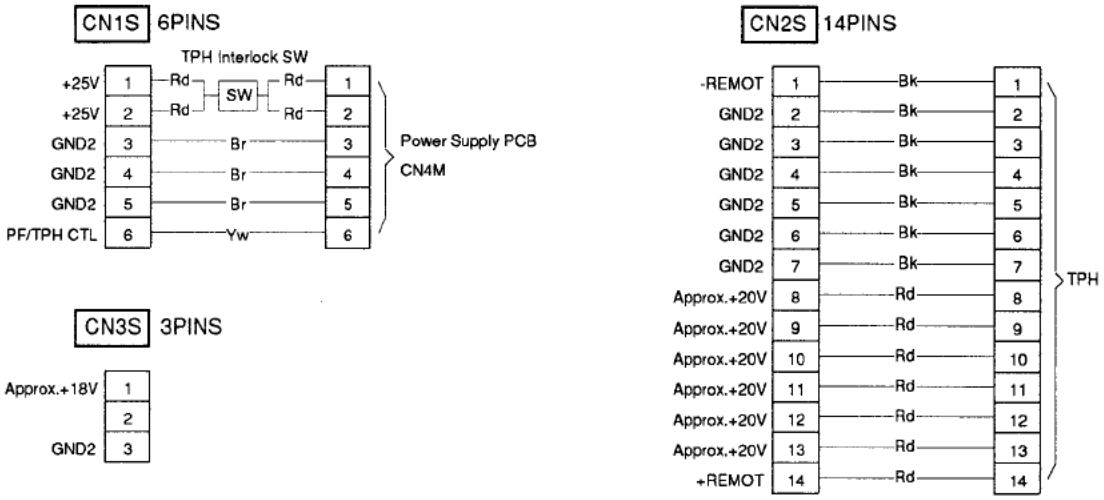
	120V Type	220-240V Type	Voltage/Pin number	Area
F1	10A 125V	T 5A 250V	Main Fuse	AC Input Voltage
F2	8A 125V	T 6.3A 250V	+24V(CN2,Pins 3 & 4)	Motor Control PCB2
F3	3.15A 125V	T3.15A 250V	+24V(CN2,Pin1) +24V(CN3,CN8)	Motor Control PCB2 Suction fan motor,Power Supply fan motor
F4	3.15A 125V	T3.15A 250V	+24VA(CN5,Pin7)	System PCB2 A-System
F5	3.15A 125V	T3.15A 250V	+24VB(CN5,Pin8)	System PCB2 B-System
F6	3.15A 125V	T3.15A 250V	+24VC(CN5,Pin9)	System PCB2 C-System
F7	3.15A 125V	T3.15A 250V	+24VD(CN6,Pin5)	Image Processing PCB2
F201	3.15A 125V	T3.15A 125V	+12V(CN5,Pin3) (CN6,Pin8) (CN7,Pin5)	System PCB2 Image Processing PCB2 LED Control PCB
F202	3.15A 125V	T3.15A 125V	-12V(CN6,Pin1) (CN7,Pin6)	Image Processing PCB2 LED Control PCB
F301	3.15A 125V	T3.15A 125V	+5V(CN2,Pin8) (CN5,Pin1) (CN6,Pin7) (CN7 ,Pin 1 & 2)	Motor Control PCB2 System PCB2 Image Processing PCB2 LED Control PCB

Power Supply PCB(N)



15. TPH Power PCB



TP

TP1 : +18 ±3V
TP2 : GND
TP3 : TPH Input Voltage (disconnected when adjusting TPH power).